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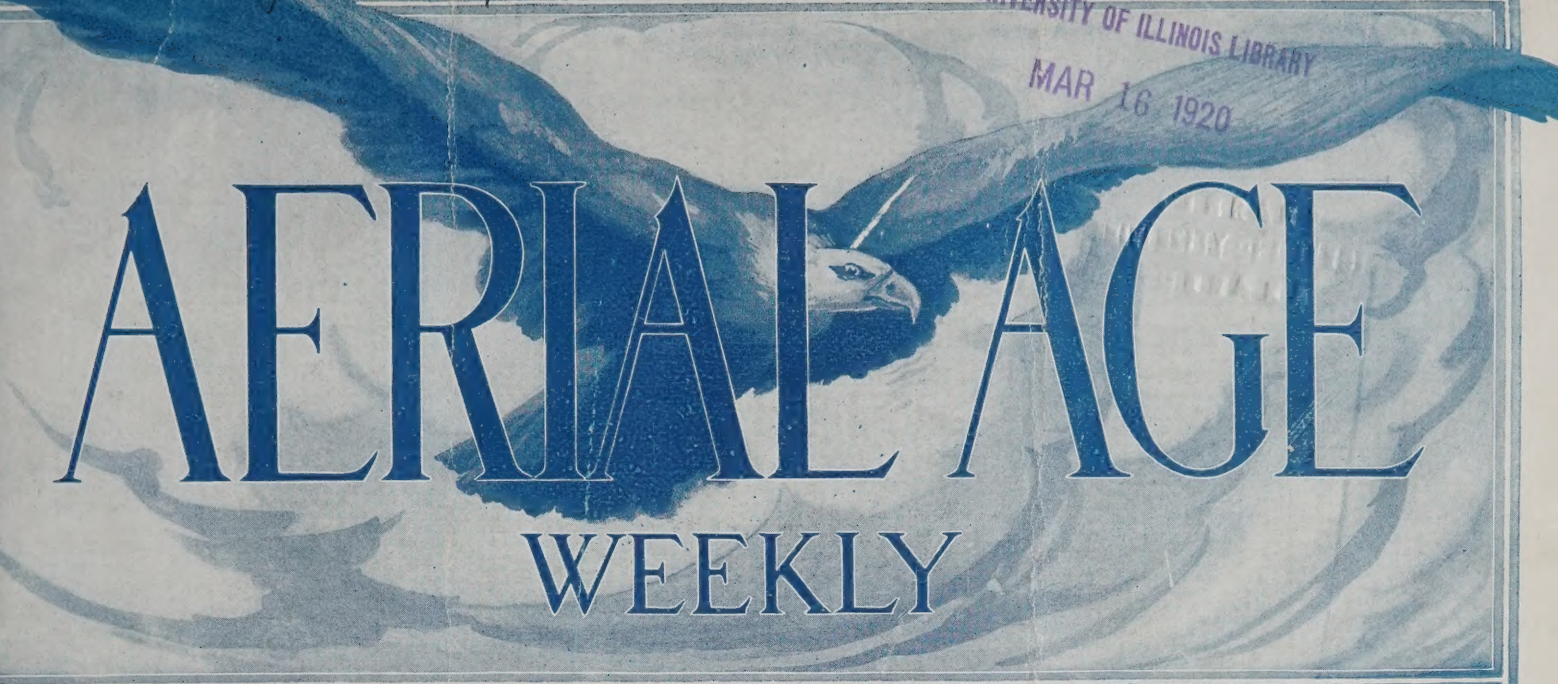

AERIAL AGE WEEKLY

Vol. 11, No. 1 MARCH 15, 1920 10 CENTS A COPY

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Rules for 1920 International Aviation Trophy Provide for Factor of Safety

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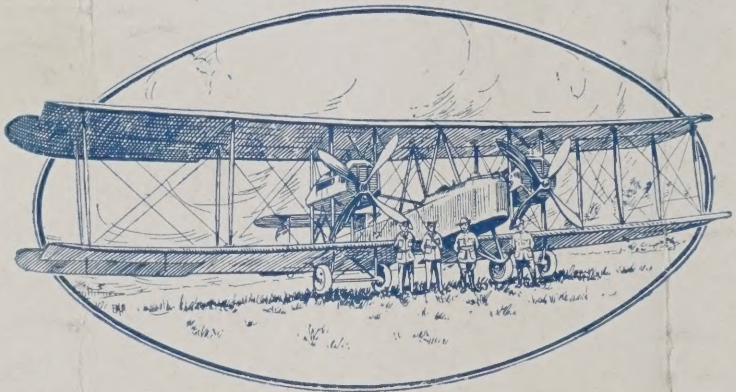

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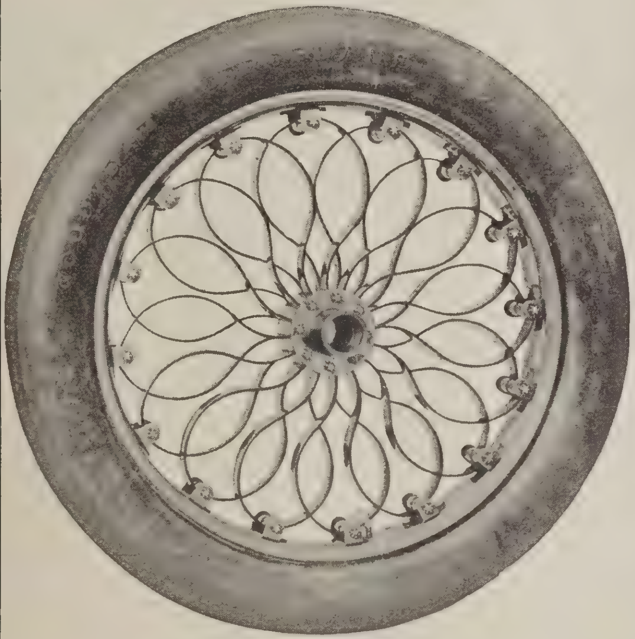

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VOL. XI MARCH 15, 1920 NO. 1

TABLE OF CONTENTS

PAGE
Rules for 1920 International Aviation Trophy Provide for Factor of Safety ... 9
100,000 Francs in Prizes for Aeroplane Safety Features ... 10
Los Angeles Aerial Rally to be Held in the Fall ... 10
The News of the Week ... 11
The Aircraft Trade Review ... 13
Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures ... 14
The New York Aeronautical Exposition ... 15
The Graphical Method for the Deflection of Beams of Non-Uniform Section ... 17
The 450 H.P. Napier Aero Engine ... 19
Central Aircraft Types ... 20
Martinsyde Aeroplanes ... 23
Naval and Military Aeronautics ... 23
Foreign News ... 24
Elementary Aeronautics and Model Notes ... 25
Aeronitis ... 26

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RULES FOR 1920 INTERNATIONAL AVIATION TROPHY PROVIDE FOR FACTOR OF SAFETY

IMPORTANT novel features intended to increase safety in flying are included in the rules and conditions for the classic 1920 International Aviation Trophy contest which the Aero Club of America has received from the Aero Club of France. These new regulations have been made necessary by the fact that aeroplanes capable of making a speed of close to 200 miles an hour are being constructed for this world aviation championship.

The new rules are as follows:

(1) The contest will be over a cross-country course of 300 kilometres in a closed circuit of 100 kilometres, starting and arriving on an aerodrome. Alightings, repairs and replenishments are allowed throughout the contest.

(2) Aero clubs must produce for each of the machines entered the following declaration:—

(a) A written declaration from the constructor that the strength of the wing structure has been calculated for a load factor of 6 for monoplanes, and for a load factor of 4 for multiplanes, with the weight of petrol and oil corresponding to the distance of 300 kilometres. For machines with variable surface these load factors must be complied with whatever the extent of the wing surface.

(b) Any declaration found to be inaccurate will entail disqualification of the competitor and forfeiture of the entry fee. The declaration of the constructors and aero clubs must reach the Aero Club de France, the organizers of the contest, seven full days before the contest.

(3) The machine must be on the aerodrome not later than 7 a. m. on the day preceding the date fixed for the contest. The officials will inspect the machines and make all verifications which they think necessary. The machines must not be altered after verification. The principal parts will be stamped or sealed.

(4) The Aero Club de France will award to the winner of the trophy a prize of 10,000 francs. The trophy will go to the national aero club of the country whose team wins the contest. The contest will take place in France toward the end of September or at the beginning of October, 1920.

In past years the contests were for the best speed made without any further conditions. The 1909 contest, which was held at Rheims, France, was for the best speed made over a distance of 20 kilometres (12.4 miles). It was won by Glenn H. Curtiss, representing the United States, who covered the distance in 15 minutes, 50 seconds, with a 45 horsepower Curtiss biplane. The 1910 contest, which was held at Belmont Park, N. Y., required covering a distance of 100 kilometres (62.1 miles). It was won by C. Grahame-White, representing the United Kingdom, who covered the distance in 1 hour, 1 minute, 4 seconds, with a 100 h.p. Bleriot monoplane.

In 1911 the distance to be covered was increased to 150 kilometres (94 miles). The contest, which was held at Eastchurch, England, was won by Charles T. Weymann, representing America, who covered the distance in 1 hour, 11 minutes, 32 seconds, with a 100 h.p. Nieuport monoplane.

In 1912 the distance to be covered was increased to 200 kilometres (124.8 miles). The contest, which was held at Chicago, Illinois, was won by Jules Vedrines, representing France, who covered the distance in 1 hour, 10 minutes, 56 seconds, with a 140 h.p. Deperdussin monoplane.

In 1913 the distance to be covered remained 200 kilometres. The contest, which was held at Rheims, France, was won by Maurice Prevost, representing France, who covered the distance of 124 miles in 50 minutes, 45 seconds, with a 160 h.p. Deperdussin monoplane.

Aero Club of America Has Challenged France for Trophy and Entered Three Teams—Still Has to Select One Team and Three Alternates

Three entries have been made by the Aero Club of America which, as the national aero club of the United States, is the only organization in the States that can challenge other countries in international contests.

The entries were sent to the Aero Club of France by the Contest Committee of the Aero Club of America, with 500 francs remittance fee for each entry.

Besides the three teams entered the Aero Club of America is privileged to send to France for this contest three teams to act as alternates, to take the place of the other teams if for any reasons they fail to start in the contest.

Having made the three entries before March 1st, as required by the regulations of the International Aeronautic Federation, the Aero Club of America has until next September to select the teams which are to represent America in the contest.

Two entries have already been received by the Aero Club of America, as follows:

(1) An entry from the Aero Club of Texas, which is affiliated with the Aero Club of America. Mr. S. E. J. Cox, a director of the Aero Club of Texas, husband of Mrs. Cox, who flew from Houston, Texas, to New York, last fall, has pledged himself to spend $100,000 if necessary to enable the Texan entry to win the Trophy.

(2) An entry has been made by the Dayton-Wright Airplane Co., of Dayton, Ohio. It is understood that a special type of aeroplane has been designed and is being constructed by the Dayton-Wright Airplane Co., and Mr. Howard M. Rinehart, the well-known aeronautic engineer and veteran pilot, will pilot the plane in the classic race against the crack pilots of the leading nations.

100,000 FRANCS IN PRIZES FOR AEROPLANE SAFETY FEATURES

AMERICAN inventors have another opportunity to win prizes amounting to 100,000 francs and international distinction by producing features and devices which make for safety in aeroplanes, according to an announcement received by the Aero Club of America, 297 Madison Avenue, from the French organization known as The Union for Aeroplane Safety, of Paris, France.

It was an American inventor that won the prize of $10,000 offered by this same organization in 1913, and the Aero Club of America authorities believe that American inventors will again give a good account of themselves in this new contest.

The invitation to American inventors to participate in this important contest is made through the Aero Club of America, as the Club is the representative of the International Aeronautic Federation in the United States, and applications for entries should be addressed to Augustus Post, Secretary, Aero Club of America.

The announcement received by the Aero Club of America states that the contests will be unlimited in scope, and any new principles in the construction of aeroplanes, whether undercarriage, fuselage, wings, devices to be attached to aeroplanes, or improvements of the engines, propellers, carburetors, radiators, spark plugs, tail skids, aeroplane brakes and automatic stabilizers, parachutes, aeroplane instruments and other similar devices will be considered.

Inventors and manufacturers are invited to suggest improvements for which prizes should be offered by the Union, addressing the suggestions to the Aero Club of America.

The regulations for the contest and the prizes to be offered for different classes of improvements will be decided after receipt of suggestions from the inventors and manufacturers of the eighteen countries represented in the International Aeronautic Federation.

The $10,000 prize offered in 1913 by the Union for the best device increasing safety in aeroplanes was won by the American inventors, Elmer A. Sperry and Lawrence B. Sperry, for the Sperry Aeroplane Stabilizer, which so completely controlled aeroplanes in flight that the pilot was able to walk all over the wings while the aeroplane proceeded steadily in its flight, entirely controlled by the stabilizer.

$50,000 LOS ANGELES AERIAL RALLY TO BE HELD IN THE FALL

TO avoid conflicting with San Francisco Aero Show, the sportsmen who are at the head of the Aero Club of Southern California have agreed to hold the $50,000 Los Angeles Aerial Rally in the fall, instead of holding it in April, as was planned.

It required real sportsmanship to give up this month, which meant that the next best dates would be at the beginning of the fall season, and many aviators who had planned to go to Los Angeles for this meet will feel somewhat disappointed—but will prepare for the fall.

Seventeen Contests With Large Prizes

Contests with large prizes open to American pilots holding the Federation Aeronautique Internationale (F. A. I.) pilot certificate, issued in the United States by the Aero Club of America, the sole representative of the Federation in the United States, are:

(1) The $25,000 prize, offered through the Aero Club of America by Mr. Raymond Orteig, for the first flight from New York to Paris or vice versa.

(2) Los Angeles Aeroplane Rally, with prizes amounting to between $25,000 and $50,000, organized by the Aero Club of Southern California and the Aerial League of the Pacific Slope, to be held in the fall. For details address Mr. K. M. Turner, President, Aero Club of Southern California, Hellman Building, Los Angeles, California.

(3) The International Seaplane Contest, to be held at Monaco, April 18 to May 2, for which prizes amounting to about $35,000 have been offered, open to pilots of all countries in cordial diplomatic relations with the United States, holding the F. A. I. international pilots' certificates. Entries should be addressed to the Secretary, Aero Club of America, 297 Madison Avenue, New York.

(4) First Alaska Aerial Derby for seaplanes, with $35,000 in prizes, organized by the Aero Club of the Northwest. Start on May 22, 1920, from Seattle to Juneau, Alaska, and return by way of Skagway, Sitka, Petersburg, Wrangell and Ketchican, 870 miles. Open to pilots of all nations holding the F. A. I. certificate issued in the United States by the Aero Club of America. Address entries to Mr. Teel Williams, President, Aero Club of the Northwest, Seattle, Washington.

(5) The *Daily Express* $50,000 prize for the first flight from Great Britain to India and back between May 1 and October 31, 1920, open to all pilots holding the F. A. I. certificate. Entries can be made through the Aero Club of America, or direct to the Royal Aero Club of the United Kingdom, London, England.

(6) The Aerial Contests to be held under the auspices of the Aerial League of Cuba and the Aerial League of America during the Third Pan-American Aeronautic Congress at Atlantic City from May 20 to May 30, 1920, open to pilots of all countries in cordial relations with the United States, holding the international F. A. I. pilots' certificates. Entries should be addressed to Major Charles J. Glidden, Chairman Contest Committee, Aerial League of America, 280 Madison Avenue, New York City.

(7) The King of Belgium Seaplane Challenge Trophy and prizes approximating $100,000, for a seaplane contest to be held at Antwerp, Belgium, in July, 1920.

(8) The six Intercollegiate Trophies and $5,000 Valentine prizes for intercollegiate contests being organized by the Aerial League of America. Entries should be addressed to Major Reed G. Landis, Secretary, Aerial League of America, 280 Madison Avenue, New York.

(9) The Curtiss Marine Flying Contest for $1,000 cash prize, open to members of the Aero Club of America and its affiliated clubs. Entries should be addressed to the Aero Club of America.

(10) Chicago Aerial Rally with prizes approximating $50,000, to be held in July or August, being organized by the Aero Club of Illinois. Address inquiries to Mr. James E. Stephens, Vice-President, Aero Club of Illinois, Chicago, Ill.

(11) The International Aviation Trophy Contest to be held in France in September, 1920, for which the national aero club of each of the countries represented in the Federation can enter three representatives. The Aero Club of Texas and the Dayton-Wright Airplane Co. have each made an entry in this contest. The Aero Club of Illinois is also considering making an entry.

(12) The International Marine Flying Trophy Contest, $5,000 first prize, to be held in Italy in September, for which the national aero club of each of the countries represented in the Federation can enter three representatives. American entries must be made through Aero Club of America.

(13) The First Aerial Derby Around the World, the rules and regulations of which are being considered by the Federation at date of writing, and for which $1,000,000 in prizes are being raised. This stupendous contest is to be an annual event, and the first Derby will take place as soon as the national aero clubs have made the necessary preparations to take care of organizing this event in the territory over which they have jurisdiction.

(14) The International Balloon Trophy Contest, to be held in the United States in October, for which the national aero club of each of the countries represented in the Federation can enter three representatives. Entries must be addressed to Aero Club of America, 297 Madison Avenue, New York.

(15) The International Aerial Derby Across the United States, with $100,000 in prizes, being organized by the Aerial League of America, which will be open to all the national aero clubs and clubs and organizations affiliated with the Aerial League of America and the Aero Club of America. Date to be announced later.

(16) The $2,000 Glidden Aerial Trophy Touring Contest, being organized by the Aerial Touring Association, of which Major Charles J. Glidden, of the famous Glidden Tours, is president. Entries must be addressed to Aerial Touring Association, 280 Madison Avenue, New York City.

(17) The Aerial Circuit of the Atlantic from New York or Atlantic City southward by way of Cuba, Haiti, Porto Rico, across the Caribbean Sea, to Caracas, along the coast to Pernambuco, across the Atlantic to Dakar, on the west coast of Africa, then northward along the coast of Africa, touching Magodor and Casa Blanca, then across Spain or Portugal to Biarritz, then along the French coast and across the English Channel to London. Then either across the Atlantic by way of Ireland to Newfoundland, or touching and across the Atlantic by way of Iceland, Cape Farwell, Newfoundland, Halifax, Portland, Boston and New York.

This annual contest has been proposed by the Aerial League of America and the tentative project has been submitted by the Aero Club of America to the International Aeronautic Federation, for consideration of the national aero clubs of the eighteen countries in the Federation. There is a possibility that it may be organized this year. Otherwise it will be organized next year. Prizes amounting to $100,000 are proposed for this contest.

THE NEWS OF THE WEEK

Flies 1,150 Miles in Day

Major A. D. Smith, army aviator who left Camp Lewis, Washington at 5 A. M. March 16 in a De Haviland aeroplane, arrived at Rockwell field at 8:58 o'clock the same evening. He covered approximately 1,150 miles and crossed two mountain ranges, making three stops en route.

Major Smith is the first to accomplish a one day flight from Washington State to San Diego.

Aero Club Organized in Duluth

A new aero club has been organized in Duluth, Minn., known as the Head of the Lakes Aero Club. The officers are as follows: Julius M. Nolte, president; Wallace H. Carpenter, vice-president; Harold G. Pickering, secretary; Lloyd H. Williams, treasurer. The directors are Julius M. Nolte, Wallace H. Carpenter, Harold P. Pickering, Lloyd H. Williams, Melvin B. Benson, Edward J. Filiatrault, William I. Prince, William K. Strickland and Fred. S. VanVliet.

Meets Wrestling Engagements by Plane

Walter W. Smith, the popular little Nebraskan bantamweight, enjoys the distinction of being the only wrestler in the world who is prepared to fill his dates by aeroplane. Mr. Smith was in the air service as a physical director and became so intensely interested in the possibilities of aviation that he intends to drop wrestling in the near future and devote his whole attention to aeronautics. Members of the air service stationed at Kelly Field and in North Scotland will remember him as the winner of the Atlantic and Southern Division championships, and as the first person to introduce American baseball and football in Dundee, Aberdeen and Montrose, Scotland.

Horace Keane Exhibits in Vanderbilt Hotel

On account of last minute changes by the Exposition management, the exhibit of the Horace Keane Aeroplane Co. could not be accommodated and the energetic management of the Keane Company immediately made arrangements with the Hotel Vanderbilt, where the machine has been since Saturday. Great interests has been aroused in the machine, and substantial orders have been recorded.

Aerial Paper Delivery

The *Memphis Press,* of Memphis, Tenn., is utilizing the facilities of the Memphis Aerial Co. for the delivery of their daily newspaper. Five machines are being used, and the event is creating great interest locally.

Navy Balloons Race in Blizzard

The nine officers who floated northward in three balloons from the Rockaway Naval Air Station, Long Island, N. Y., through a blizzard in an unofficial race have made safe landings.

It was stated that the balloon commanded by Lieut. A. R. Houghton, accompanied by Lieut. Stephen Farrell and Ensign E. C. Hulett, had won, since it arrived at Reaching, Quebec, Canada, while another, commanded by Ensign L. A. Kloor, reached Orleans, Vt., and the third, under Lieut. Carpenter, touched ground at Canaan, N. Y.

Lieut. Houghton was in the air about twelve hours, while Lieut. Carpenter, who apparently was out of both luck and wind, stayed up twenty hours. Ensign Kloor's time is not stated. Intense cold prevailed over New England during the flight.

Spokane Aviation Co.

Backed by three former army pilots and a first-class civilian mechanic, the Spokane (Wash.) Aviation company has just been formed. It is intended to do all kinds of commercial flying, and also conduct a school for student aviators.

William Barnard, Sam Stenstrom, Dave Matthews of Moscow, Ida., are the flyers, and Nathan Barnard will handle the mechanical work. The company already has the JN's, and proposes to buy a three-seater in a short time. Construction of a four-plane hangar has already been begun on the municipal landing field at Parkwater, just outside the city limits. Passenger carrying work has already been begun.

New Aeroplane Speed Record

Milan.—A new record of aeroplane speed was made recently at Turin by Lieutenant Brack Papa, who during an officially controlled flight with one passenger in a "B. R." machine made 277 kilometers (about 172 miles) an hour, with an average speed of 273 kilometers.

Successful Flight in Gale

Flying on the northern edge of the southwestern storm area in the face of a 35-mile northeasterly wind, Lieut. Col. H. M. Hickman and Capt. St. Clair Street went from Washington to Mineola in a D. H. Liberty plane, making the 230 miles in 150 minutes.

Their rate was about one and a half miles a minute. The two officers came to take charge of the army exhibit at the Aero Show at the 71st Regiment Armory, New York City.

Lands Aeroplane Without Use of Elevators

Washington.—A few days ago an accident occurred to a Le Pere aeroplane while it was being driven by a test pilot.

"Flying level at an altitude of a little more than a thousand feet, the pilot pushed the stick ahead to dive for the field. The plane did not respond. A pull back left it still flying level. The pilot found that he was without the use of his elevators. It later proved that the small steel band around the stick to which the elevators are attached had broken. The ailerons were all right.

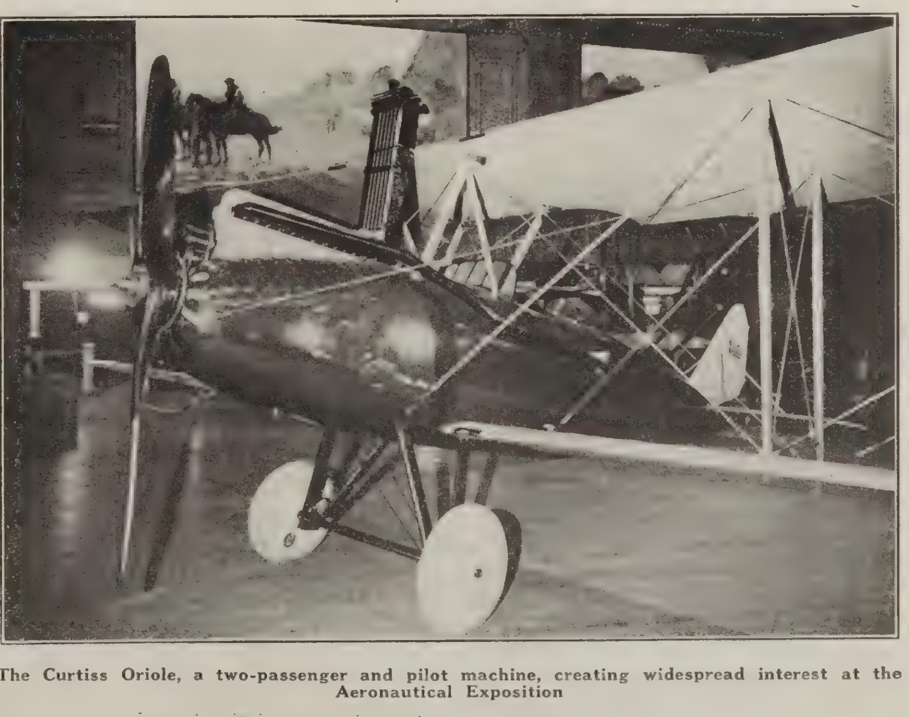
"The aeroplane was tail heavy, the result being that it flew level, with the motor turning 1,450. The pilot decided that perhaps the motor could be throttled to make the ship dive gradually, and that it would level out when the motor was turned full on. It took several moments for him to get courage enough to put the ship in a dive. Then came the agonized waiting while the motor went full on. Slowly and surely the plane righted itself.

"A mile back of the field he dived again, with the motor turning about 1,200. At 300 feet the throttle crept forward bit by bit, and the machine leveled and made a smooth two-wheel tail-high landing. Now the Le Peres are equipped with a triple thickness band around the stick."

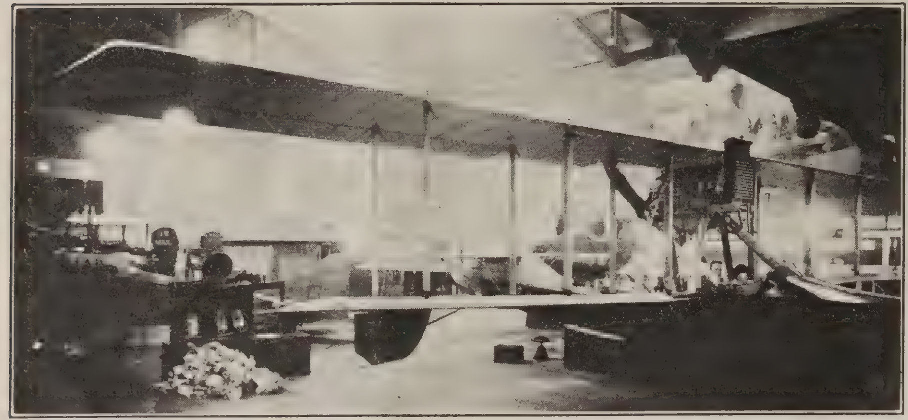
The Berliner Helicopter

Washington.—After years of experimenting, Henry A. Berliner, an aeronautical engineer, announces that he believes he has solved the old aeronautical problem of vertical flight by lifting propellers, known as the helicopter.

In 1910 Emile Berliner, father of the inventor, constructed a large double propeller apparatus, called a gyrocopter, which is the basis of his son's invention. Before this two propellers rotating in opposite directions had been thought to be necessary, because with one the rest



The Curtiss Oriole, a two-passenger and pilot machine, creating widespread interest at the Aeronautical Exposition



The Curtiss Seagull, a flying boat that is a favorite with sportsmen at the Aero Show

of the apparatus rotated around the shaft of the propeller. Mr. Berliner sought to overcome this by mounting a small auxiliary vertical fan about ten feet from the shaft of the lifting horizontal propeller. This fan opposed the turning impetus, or torque, of the lifting propeller.

In June, 1909, the elder Mr. Berliner had succeeded several times in lifting a man with the machine, but the lifting was not steady. He kept up his experiments until 1914, when he was forced to abandon them because of a nervous breakdown. His son Henry then took up the problem. The younger Berliner, describing his experiments, said:

"I spent several months in constructing a scientific testing apparatus and with which I tried various types of small lifting propellers, singly or in group, and I finally calculated and designed the first helicopter apparatus that proved successful. This machine weighed 570 pounds, and the revolving cylinder motor was an 80-horsepower Le Rhone. The two propellers were thirteen feet in diameter and ten inches wide and the total perfectly steady lift was nearly 900 pounds, or sixty pounds a square foot of effective lifting surface. An aeroplane has an average lift of about eight pounds a square foot.

"The head resistance of a gyrocopter is small, and great speed forward may be expected from it. My father always intended that the gyrocopter should be provided with floats and that at first it should be a water craft, flying low near the surface of the rivers, lakes and ocean, so that it could descend quickly to safety in case of accident. Future development may result in some means for coming down on land from great heights as safely as an aeroplane can."

Symons-Russell Company Active

The first carload of new aeroplanes ever shipped into Spokane was received here recently by the Symons-Russell Aviation Co. They were all Curtiss JN.'s, shipped from Buffalo, N. Y. All have been sold. Fred Hungate, of Pomeroy, Wash., and William Burke, of Almira, Wash., each took one ship, and the other has been taken by an ex-army flier. Hungate and Burke were the first two men graduated from the Symons-Russell Flying School. Both follow farming and are preparing good landing fields on their ranches. The ships will be used both for pleasure and commercial work.

Another carload of planes, a JN and an Oriole have been ordered by the company for use in its own business. The company reports great interest in aviation work throughout the territory for which they are distributors of the Curtiss products.

American Aviators Carry Messages to Poles

Lemberg, Poland.—Recently American aviators with the Kosciusko Squadron were requested to get an urgent message to an isolated Polish unit in a wild stretch of the Ukraine.

Lieut. Elliott Chess of El Paso, Tex., and Capt. Edward J. Corsi of Brooklyn were despatched on the mission.

Chess, on his arrival was arrested as a Bolshevik, as the nose of his plane was painted red. He was unable to speak Polish, but an officer came up and solved the difficulty.

Next day a patrol brought news that another plane had descended twenty miles away. Chess found Corsi in a little village. He had been forced to land, and was fired on by Polish soldiers before they recognized the insignia on his machine.

Capt. Arthur D. Kelly of Richmond, Va., operations officer of the Kosciusko Squadron, received notification that he had been awarded the war medal of the Aero Club of America for his services with the 96th Aero Squadron of the American army.

Ethel Dare to Change Planes in Air

Chicago.—S. J. Cowing, formerly a military instructor in aviation, has announced the personnel of his new act. The feature performer will be Ethel Dare, who Mr. Cowing announces will change planes in mid-air with a rope ladder. Miss Dare is an experienced parachute jumper.

E. L. Partridge and Walter Pack, famous night flyer, are the other performers. Four planes will be used, with five pilots and four skilled mechanics. Mr. Cowing will send two planes ahead and have them in readiness for each succeeding engagement.

Harry Roy Knabenshue Married

The marriage of Miss Elinor N. White, of Dayton, Ohio, to Harry Roy Knabenshue, of Los Angeles, Cal., recently took place.

Mrs. Knabenshue is one of Dayton's most attractive and popular young women. The bridegrom is the son of A. Roy Knabenshue, noted aeronaut and manufacturer of dirigibles. Since receiving his release from the Air Service in which he was stationed overseas for 16 months, Mr. Knabenshue has been associated with his father in business as aeronautical engineer. He is a member of the Aero Club of America.

Air Service Post Holds Successful Dance

The Air Service Post, American Legion, held an informal dance at the Hotel Pennsylvania, New York City, on March 4th.

The affair was very successful and attended by a large number of Air Service men.

The Entertainment Committee consisted of Jarvis S. McCrea, chairman, Howard J. Asher, Leonard M. Gillem, Carl A. Haller, C. Stanley Jacob.

The Air Service Post is located at the Aero Club of America, 297 Madison Ave., New York City.

The Dayton-Wright Limousine, one of the features of the Aero Show

The AIRCRAFT TRADE REVIEW

N. E. J.

New Boston Company

The American Aerial Company has been organized in Boston and has secured the Kenberma Flying Field at Nantasket Beach, where passenger carrying will be engaged in this spring and summer.

Negotiations are nearly completed for another field at Hingham, Mass. Routes are being mapped out between various New England towns and Boston for aerial taxi purposes.

The company is using aero machines secured from the Interallied Aircraft Corporation of New York.

The Late H. W. Ashmusen

H. W. Ashmusen, the aeronautic motor designer and builder, died of pneumonia in Omaha, Neb., on February 13th. Mr. Ashmusen had just recently completed arrangements in the city for the manufacture of his particular type of motor, which has been frequently referred to in AERIAL AGE.

Thompson Aeroplane Co. Establishes School

The Thompson Aeroplane Company of Detroit, Mich., handling the Curtiss Aeroplane Agency, has been carrying on a campaign to arouse interest in aviation throughout the State of Michigan.

They are maintaining a school of both advanced and elementary flying in Detroit, and offer instruction on both land planes and flying boats.

The Thompson Aeroplane Co. has assisted in the establishing of an Aero Club at Grand Rapids and an Aviation Country Club in Detroit.

C. E. Robinson, formerly connected with the Royal Air Force, is manager of the organization, and H. J. Browne, formerly Lieut. J. G. in the Naval Air Service, is assistant sales manager and in charge of flying-boat activities.

A New Aviation Instrument

The "rate-of-climb meter," is the description applied to a device being evolved by the United States Bureau of Standards. The invention is an instrument for recording the rate of ascension of an aeroplane or other altitude climbing objects.

The tube or thermometer, technical description of which is being withheld until scientific tests have been completed, operates under the accepted theory that air pressure is gradually minimized the higher you mount in exploring the clouds. Measured by the time having elapsed for the air to leak from the tube-like meter, the pressure indicator tells the rate of speed attained by the aeroplane.

The measuring scale of the rate-of-climb meter is independent of altitude when the object is stationary.

Offers Free Air Trips

To popularize the aeroplane as a means of travel and to demonstrate its safety to the public, the Inter-Allied Aircraft Corporation announced that it would give free aeroplane rides over the city to all those interested in aeronautics. Six Avro planes, all piloted by former military aviators, have been put into commission for this purpose. The planes used are of the three-passenger type, driven by 110 horsepower motors, and have a maximum speed of ninety miles an hour.

A pathfinder plane will map air routes for passenger trips to different cities and winter resorts. The first trip will be made to Atlantic City. Pictures of the sights en route will be taken and later displayed to the public to afford an idea of how different points look from the sky.

Aircraft Insurance Offered by Chicago Company

With the view that the steady growth of the aircraft industry opens a wide field for the insurance of aircraft, Messrs. Klee, Rogers, Wile and Loeb, insurance agents and brokers, of Chicago, Ill., are offering protection for the conservative development of aeronautics. They are writing aircraft policies for fire, theft, collision, property damage and accident insurance.

New Air Speed Record Set

Turin, Italy.—Lieutenant Brakpapa created a new speed record recently for aeroplanes with four passengers, flying 162 miles an hour.

Florida-Havana Aero Service Opens

Havana.—The first passenger aeroplane service between Palm Beach and Havana was inaugurated recently with the arrival here of a seaplane carrying as passengers Mrs. David R. Calhoun, of St. Louis, and Miss Mary Esther Wood and Robert L. Ireland, of New York.

The flight was made in two hours and forty-five minutes.

Quits Baseball for Jitney Aeroplane

Wally Schang, catcher of the Boston Red Sox, has announced his intention to go into the jitney aeroplane business. He says he is through with baseball.

Chase With Power Plants Corporation

Herbert Chase, assistant secretary of the Society of Automotive Engineers, has accepted a position with the Power Plants Corporation, a company organized to undertake engine development and other work of related character, a line of endeavor in which Mr. Chase has long been interested.

Mr. Chase is widely acquainted and favorably known in automotive circles. It is understood that the engines he expects to develop will be of a type capable of utilizing the cheaper grades of fuel and that they will probably operate on the constant-pressure cycle.

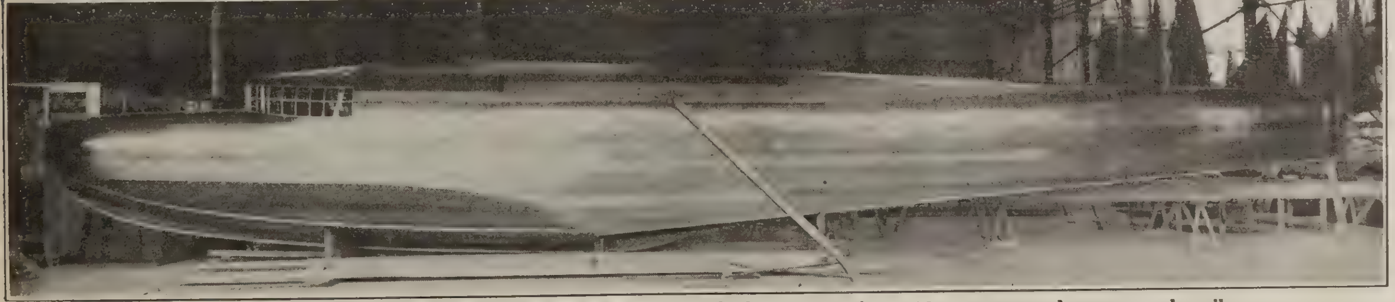
During the war Mr. Chase did excellent work while in charge of the Washington office of the society. He served also as a member of the Committee on Powerplants for Aircraft of the National Advisory Committee for Aeronautics. He has held membership on numerous committees of the society, having for three years much to do with the arrangements for the professional papers and the meetings and doing very faithful and effective work in this connection.

Personal Pars

George J. Mead, who has been engineer in charge of the power plants laboratory for the air service at Dayton, Ohio, during the past year, has resigned to become quality manager with the Wright Aeronautical Corporation at New Brunswick, N. J.

Leigh M. Griffith, senior staff engineer of the National Advisory Committee for Aeronautics, has transferred his office from Washington to the research laboratory of the Committee at Langley Field, Hampton, Va.

Charles Pack, chief chemist and metallurgist of the Doehler Die-Casting Co., Brooklyn, N. Y., was elected secretary and chief chemist at a recent meeting of the board of directors of that company.



The hull of the Cuba-West Indies Airways flying boat which accommodates 12 passengers, baggage and mail

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committees find it hard to make an adequate report of the situation in less than two hundred printed pages. AERIAL AGE *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congresional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in AERIAL AGE *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Responsibility for Deeds

Col. Edward A. Deeds, of Dayton, Ohio, was placed in charge of the Equipment Division of Aviation under Gen. Squier in August, 1917, four months after our entry into the war. Nothing appears in any of the hearings of any investigation to show why Deeds was appointed. Deeds knew nothing of aircraft. Deeds had never been connected with any Government activity. Secretary Baker says he never saw Deeds until after his appointment, although Deeds and Secretary Baker were both from Ohio.

Justice Hughes' report found that Deeds began his activities by centering aircraft operations at Dayton, Ohio; that he gave large contracts to his business associates—Kettering, Talbott, and others in that city, although they had no previous experience in such matters; that he located several aviation fields around Dayton in improper locations, and also located fields in Florida without authority or explanation; that Deeds was largely interested in corporations controlling the Delco ignition system used in the projected Liberty motor, whereas prior to its use on the Liberty the magneto system had been used on all airplane engines (p. 58).

The following is from the Hughes report (p. 57 of record):

> At the inception of the Government's aviation activity in connection with the war and within the sphere of Col. Deeds' important if not commanding influence, his former business associates were placed at once, through Government contracts, in a position where they had assurance of very large profits upon a comparatively small investment of their own money, and in addition were able to secure generous salaries which they charged against the Government as part of the cost of manufacture.

After reciting evidence in support of his conclusions, Justice Hughes finds:

> The evidence with respect to Col. Edward A. Deeds should be presented to the Secretary of War, to the end that Col. Deeds may be tried by court-martial under articles 95 and 96 of the Articles of War.

Justice Hughes' report in part 2 of this report includes a detailed statement of testimony on which the finding was based.

In the Attorney General's report (page 58 of the record) this finding appears:

> I acquiesce in the recommendations of Judge Hughes that the facts be submitted to the Secretary of War.

Because of these findings and recommendations for court-martial it is proper to say that about four years before his appointment to produce aircraft, Deeds achieved considerable notoriety in Ohio, where he was prosecuted in the Federal Court for alleged bribery and criminal methods in driving his competitors out of the cash register business, and was convicted by a jury after a trial lasting over a month and sentenced to imprisonment for one year.

An appeal was taken, with 50 assignments of error, and the case was reversed and no retrial was ever had (p. 50-52). Deeds' innocence may be conceded, for the sake of argument, though no second trial occurred, but the charge, conviction and court record were enough to put any responsible official on inquiry before giving Deeds a place of transcendent importance in charge of matters about which he knew nothing.

Why Was Deeds' Court-Martial Prevented?

For Deeds' alleged efforts to place large Government contracts with his business associates in Dayton, under questionable arrangements, and for other reasons stated in his report, Justice Hughes recommended Deeds for court-martial (p. 57-58), and Attorney General Gregory joined in the report to the extent of declaring Col. Deeds' conduct inexcusable, reprehensible and censurable, and recommended that all the facts be submitted to the Secretary of War (p. 58).

Based on the Hughes record, the Judge Advocate General's office on November 11, 1918, submitted its report approving the Hughes recommendations and holding, in addition, that if Col. Deeds was under oath when testifying before the Senate committee he should be court-martialed for perjury, if false statements were shown to have been made (p. 2652).

Subsequently, Secretary of War Baker sent word to the Judge Advocate General's office requesting that other witnesses be heard on behalf of Deeds and that the report be reconsidered (p. 2653). This action, your committee is informed, was unprecedented. Col. Deeds' attorney and two business associates, connected with these same Government contracts, were thereupon heard and a new report rendered exonerating Deeds (p. 2687). Secretary Baker's activity in protecting Deeds against Justice Hughes' finding is at once astonishing and significant. With a record that affected lives of men and charges of inordinate selfishness supported by specific facts, Deeds should have been placed on trial to be convicted if guilty, to be vindicated if innocent. According to the testimony, Secretary Baker prevented such action.

Col. Deeds was thereupon banqueted in Washington (p. 59) and praised by Gen. Squier for his record in aircraft production.

The approval of Deeds by Squier and the saving of Deeds from court-martial by Secretary Baker require no further discussion to reveal disheartening conditions surrounding American aircraft production in 1917. Whether conditions ever improved is a matter of grave doubt. Gen. Squier is still Chief Signal Officer and Gen. Menoher is now in charge of aviation—an artillery officer, courteous and obliging, but without aviation training or experience. Secretary Baker's judgment is a matter of record.

Deeds, after filling many positions in the aircraft production branch of the Signal Corps, was finally sidetracked about January, 1918, and Col. Robert L. Montgomery, a bond dealer, was placed at the head of the Equipment Division, "but despite the change in technical relation it is apparent that Col. Deeds remained in practical charge, under the Chief Signal Officer, of production." (Hughes' report.)

Potter and Ryan, Directors

In February, 1918, William C. Potter became the head of the Equipment Division and remained in this position until May 20, 1918, when Gen. Squier was removed from aviation duties and John D. Ryan, who had been acting since April, was appointed Director of Aircraft Production, with Potter as assistant director.

Apart from the responsible officers named a number of advisory boards existed—of doubtful value, and with no powers or responsibilities. They included an Advisory Committee for Aeronautics, a Joint Army and Navy Technical Aircraft Board, an Aircraft Production Board, and an Aircraft Board. These boards were in existence at different times, but could only advise and recommend. To what extent their advice was followed or ignored does not appear, other than as it may have been adopted by Deeds, Potter or Ryan, who were the responsible aviation officers during practically all the time from August, 1917, to the end of the war.

In an official War Department publication, published by Maj. Mixter, on "Aircraft Production Facts," appears the following:

> In January, 1918, W. C. Potter, of the Guggenheim interests, became Chief of the Equipment Division. When the Air Service was separated from the Signal Corps in May, 1918, John D. Ryan, of the Anaconda Copper Co., was appointed Director of Aircraft Production and later an Assistant Secretary of War and Director of Air Service. Mr. Potter continued as First Assistant Director of the Bureau of Aircraft Production (p. 61 of the record).

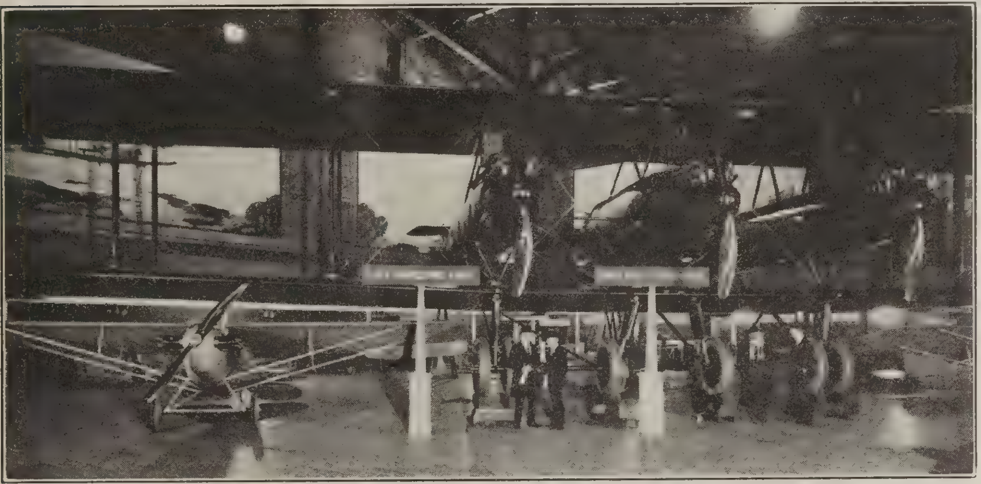
(*To be continued*)

THE NEW YORK AERONAUTICAL EXPOSITION

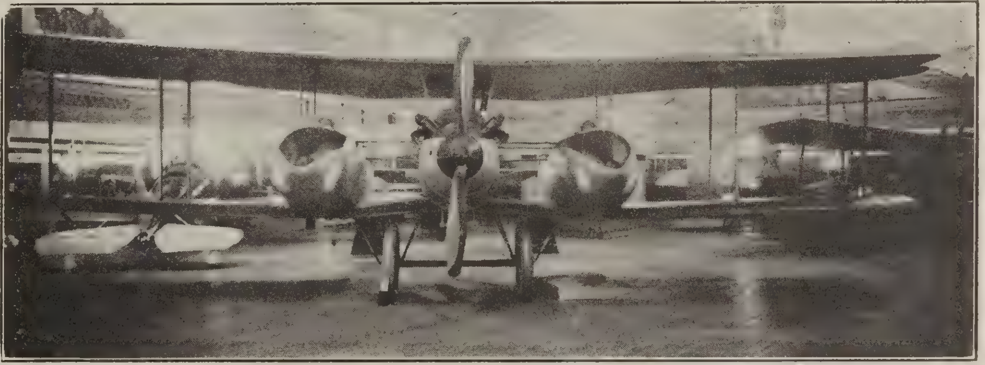
INCREASING interest has been shown in the New York Aeronautical Exposition each day since the opening on March 6th, and while no tabulated reports of total sales are available at time of writing, it is understood that most of the exhibitors have secured substantial orders.

The show is strictly a commercial one, there is not an Army or Navy machine in the hall, which is in distinct contrast to the show of last year.

In the place of the military machines there are many types of civilian aircraft which have sprung into the air since the signing of the armistice sixteen months ago, the L. W. F. freighter, a three motored "ship" capable of carrying a crew of four men and 6,000 pounds of mail or freight; the Curtiss Eagle, a ten-passenger enclosed machine; the Aero-marine limousine, a luxuriously equipped three-passenger flying boat; the Wright aerial coupe, a cabin cruiser; the Goodyear pony blimp, a sport dirigible, the Thomas Morse mail plane, the West Virginia training plane and the very small sporting Cato monoplane.

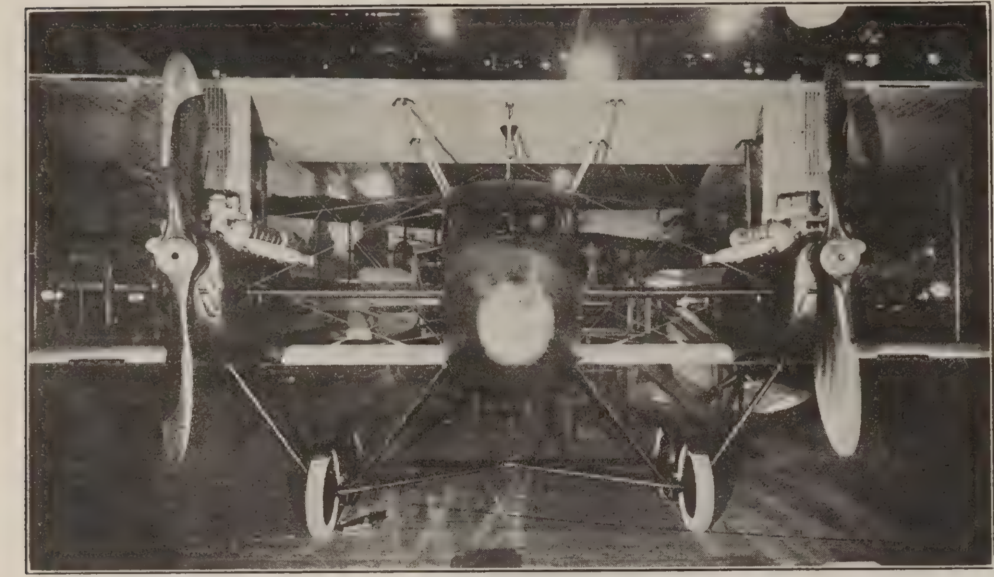


The Three Liberty motored Aerial Mail Plane, the largest machine in the show, and the Cato Sporting Monoplane, the smallest machine. A study in contrasts

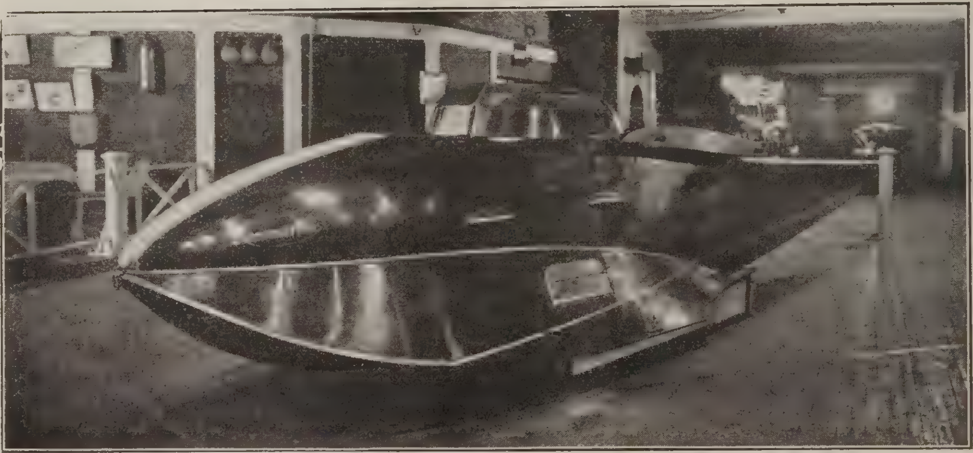


The Twin Hispano Suiza motored Aerial Mail Plane, designed for the longer land aerial mail routes that are being planned for the coming summer

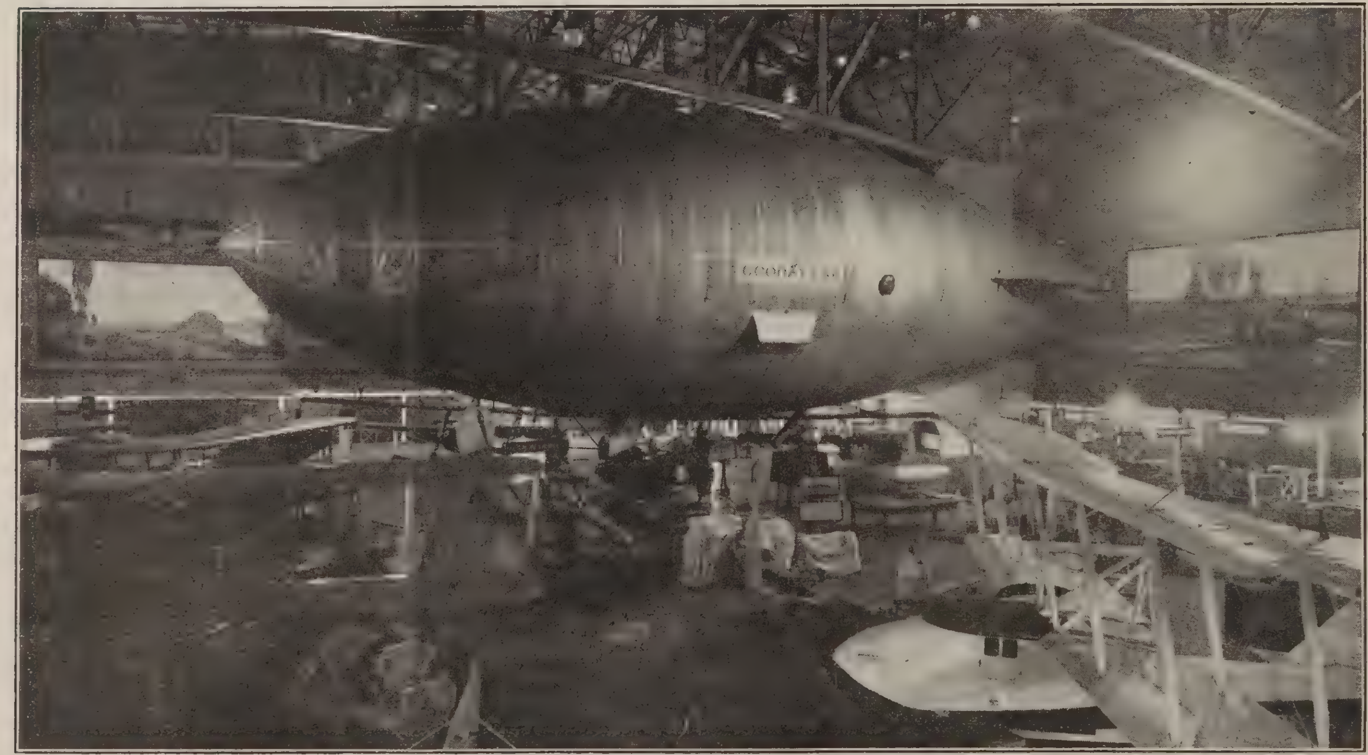
The West Virginia Biplane in the foreground and Dayton-Wright Limousine on the left background



Front view of the twin motored Curtiss Eagle, a luxurious passenger machine, which has aroused great interest among the show visitors



One of the Aeromarine flying boat hulls, comfortably equipped for two passengers and pilot



General view of the Exnosition. On the left some of the Curtiss machines, on the right the Aeromarine limousine flying boats, and suspended from the roof the Goodyear Pony Blimp

THE GRAPHICAL METHOD FOR THE DEFLECTION OF BEAMS OF NON-UNIFORM SECTION

By B. C. BOULTON, H. M. PRIEST

Engineering Division, McCook Field

IN several types of aeroplanes it is important to be able to calculate the deflection curve of the wing beams. When the loading on a beam is not uniform the determination of the deflection becomes merely more difficult, since special formulas have to be developed. But when the cross-section of the beam is not uniform throughout, any accurate analytical calculation of the deflection is practically impossible. The purpose of the present article is to bring to the attention of aeronautical designers a graphical method of solution that is very simple to apply, and yet gives results whose accuracy is limited only by the care taken in the work.

One important case in which it is necessary to obtain the deflection of a spar of non-uniform section is that of a tapered wing. Here, both the load and the spar taper from the root out to the tip. If the aeroplane under consideration has a truss type of cellule the deflection of the spars in the span between a and b, Fig. 8, under the distributed load has an important effect on the stresses. The maximum bending moment in the spar is increased by an amount equal to the deflection multiplied by the compression in the spar. Since this moment is the product of these two quantities, each of which is proportional to the loading, it varies as the square of the loading, and when a high loading factor of 8 or 9 is required this secondary moment may exceed the moment due to the distributed load. It is in single bay machines of fairly large span that this secondary moment due to the deflection becomes most serious.

In aeroplanes such as the Fokker D-7 the upper and lower wings are internally braced cantilevers. The deflections of the wings are equalized by the use of an "N" outboard strut. In the Fokker D-7 the upper and lower wings are not the same size, and hence, without the outboard strut would not deflect equally. Therefore, as a strut is used, one wing takes a part of the load from the other. Before the final design can be made of the spars the distribution of load between the two wings must be determined. This can be done as follows:

1. Determine by the graphical method the deflection at the strut point of the upper and lower spars due to the distributed load on each.
2. Subtract these deflections to obtain the relative deflection of the spars at this point.
3. Apply a concentrated load of unity both to the lower beam and to the upper beam at the strut point and determine the deflection of each beam at this point due to this load.

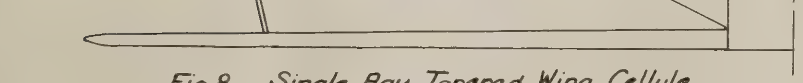


Fig.8 Single Bay Tapered Wing Cellule

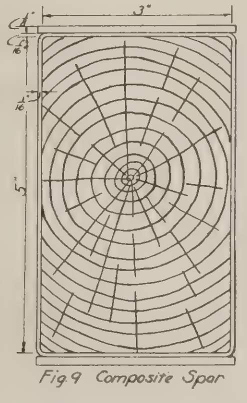


Fig.9 Composite Spar

4. The relative deflection of the beams at the strut point produced by the distributed load divided by the numerical sum of their deflections due to the load of unity equals the value of the stress in the strut, or the amount of support that one beam affords the other. Knowing this value the bending moments on both the upper and lower wing beams can be computed.

There are several designs that have been built or proposed in which the wings are unbraced cantilevers. So far as strength is concerned, such wings can be readily designed, but in the opinion of many engineers this type of construction is limited by the large deflections of the wing tips. Whether or not this deflection is detrimental to the flying qualities of the aeroplane, the determination of the deflection curve of the wing spars is an essential part of the stress calculation. Since the wing spars in such a type of construction are always tapered, and are frequently built up of both wood and steel, the use of a graphical method in the determination of the deflection is necessary.

It may be well at this point to give an example explaining the calculation of the moment of inertia of a beam in which wood and steel act in combination. The method given is known as the method of "transformed sections." In other words, the steel is transformed into an equivalent of wood. Let the section of the beam be as shown in Fig. 9.

Calculation of Moment of Inertia of Composite Beam

I of Wood

$$I = \frac{3 \times 5^3}{12} = 31.2$$

Modulus of elasticity of wood $= E_w = 1{,}600{,}000$ lbs. per sq. in.

Modulus of elasticity of steel $= E_s = 30{,}000{,}000$ lbs. per sq. in.

$n = E_s/E_w = 18.7$

The transformed $I_s = 171.5$

$I_w = 31.2$

Total I of the section $= 202.7$

I of Steel

Webs $I = \frac{2 \times .0625 \times 5^3}{12} = 1.30$

Flanges $I = (3.125 \times .1875 \times 2) \times 2.594^2 = 7.87$

Total I of steel $= 9.17$

In further computations the spar can be treated as if it were all wood, and the modulus of elasticity of wood should be used where the modulus of elasticity is called for.

The Graphical Method.

The explanation of the graphical method of deflection for beams of non-uniform cross-section which is given below is based on the methods given in Morley's "Strength of Materials," p. 185-187.

Both analytical and graphical methods for determining the deflection of a beam are developed on the principle that the deflection curve can be obtained from the loading curve by four successive integrations, or, if the moment curve is known, from the moment curve by two successive integrations. In the method that is to be described these integrations are performed graphically. The principle made use of in the graphical solution given is that the ordinates of any funicular or equilibrium polygon, when multiplied by the proper scale, equal the double integral of the original curve from which, first the force polygon, and then the funicular polygon are derived.

An explanation of the construction of force and equilibrium polygons will be given before taking up in detail their application to the problem of deflections. Referring to Fig. 5, assume that line A-B represents a beam with a distributed load varying as shown by curve ACB. Since it is necessary to deal with concentrated rather than distributed loads, divide the loading into any convenient number of parts and compute the amount of load in each section. Consider these loads as concentrated forces applied at the center of gravity of their respective sections. Next, lay off these forces to scale on line 0-10, Fig. 6, so that each force is represented both in magnitude and direction. As, in the case under consideration, all the forces are parallel, this line is straight. Its length 0-10 equals the total load on the beam. The force polygon is now completed by selecting some point, known as the pole, situated any convenient distance from line 0-10, and drawing lines, called rays, to this point as shown. Line h_1 is a perpendicular from the pole to the resultant of the forces, in this case line 0-10; its length is called the pole distance. To construct the equilibrium or funicular polygon, Fig. 7, draw a string, 0, parallel to the first ray O-P and produce it until it intersects the line of action of the force 1 at some convenient point. Then from this intersection draw another string parallel to the ray 1-P so that it intersects the line of action of force 2. In the same manner the remaining strings are drawn, each parallel to its corresponding ray. If the forces are consecutively numbered it will be observed that the number of the string drawn to each force is one less than the number of the force; for example, string 7 is drawn from force 7 to force 8. The first and last strings are said to hold the forces in equilibrium. The polygon is closed by a line joining the points of intersection of the first string and the first force, and the last string and the last force. If the loads were really concentrated, the closing line would be line 1-10, shown dotted, but when the load is distributed the line of closure joins the intersections of the first and last strings with verticals through each end of the loading. It will be noticed that the equilibrium polygon in Fig. 7 is not made up of a series of straight lines but is a smooth curve. It is the true equilibrium polygon of the distributed load and is obtained by inscribing a curve in the polygon which is composed of the straight strings.

For a more complete discussion of the methods of graphics that are employed, reference may be made to Spofford's "Theory of Structures," p. 337-341.

In the example chosen to illustrate the determination of the deflection curve of a beam of non-uniform section, the moment of inertia of the beam varies as shown in Fig. 1 and the loading as in Fig. 2. But slightly more work would be entailed if the variation of either the moment of inertia or the loading, or both, had been irregular instead of uniform. The load on the beam is divided into a convenient and reasonably large number of parts. The area of each section, which represents a certain amount of load, is considered as a concentrated force applied at the center of gravity of the section. These areas are now plotted to scale on the line 10-0 and the force polygon of Fig. 3 constructed. From it the bending moment equilibrium polygon of Fig. 4 is obtained, as previously explained. The true polygon must be inscribed in the polygon as constructed with the straight strings for its sides. Then any ordinate of this true polygon, if multiplied by the proper scale, equals the bending moment on the beam at that point.

The next step is to divide the bending moment on the beam at a number of sections by the moment of inertia of the beam at those sections. By plotting these quotients on a line A-B, Fig. 5, representing the beam, the M/I curve is obtained. Again, the area under this curve is subdivided, the area of each part computed and applied as a concentrated load at the center of gravity of the section. From these areas the force polygon of Fig. 6 is constructed, and from the latter, the final deflection equilibrium polygon. When a smooth curve is inscribed within the polygon so drawn, the vertical distances between the line of closure and this curve, when multiplied by the correct scale and then divided by the modulus of elasticity of the material in the beam, equal the deflections of the beam. The point of maximum deflection is the point of tangency to the deflection curve of a line parallel to the line of closure.

The calculation of the scale for each diagram is clearly shown on the various figures.

E = modulus of elasticity in lbs. per sq. in.
I = moment of inertia in in.^{4}.
1 in. = q in. for the linear scale.
1 in. = p lbs. per in. run.

For Fig. 2, 1 sq. in. = pq lbs. and for Fig. 3, 1 in. = n sq. in. from Fig. 2 = npq lbs. With the pole distance in Fig. 3 equal to h in. the scale for the bending moment polygon becomes 1 in. = npq^{2}h in. lbs.

Dividing the ordinates of the moment equilibrium polygon by the corresponding ordinates to the moment curve and plotting the quotients to the scale 1 in. = m in. of M/I, the scale for Fig. 5 becomes 1 in. = mnpq^{2}h lbs. per in.^{3}, and 1 sq. in. under the M/I curve = mnpq^{3}h lbs. per sq. in.^{2}.

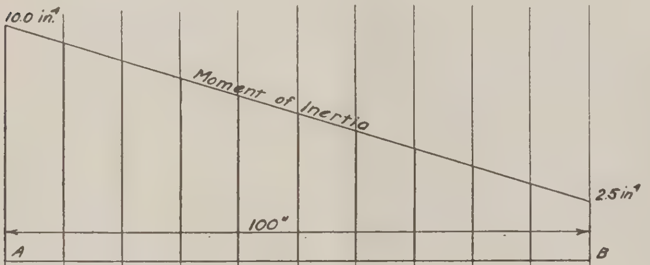


Fig. 1 Curve showing Variation in Moment of Inertia of Beam

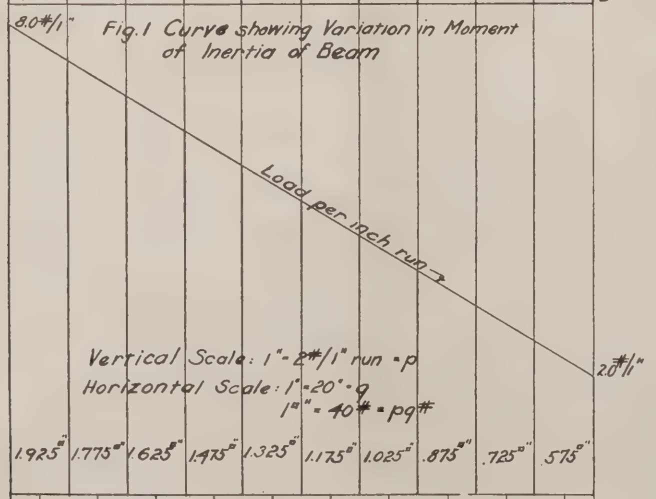


Fig. 2 Curve showing Distribution of Load on Beam

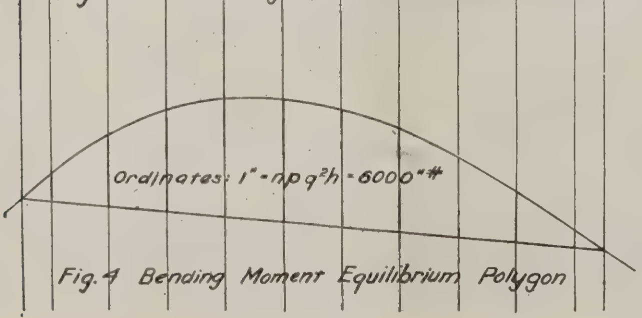


Fig. 4 Bending Moment Equilibrium Polygon

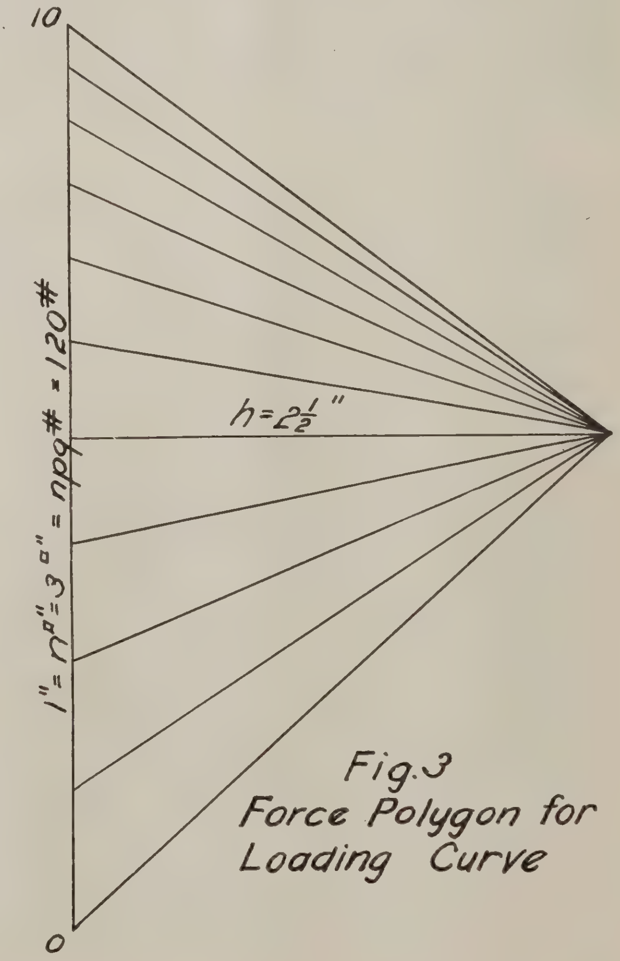


Fig. 3 Force Polygon for Loading Curve

For Fig. 6, in the same way, let 1 in. = r sq. in. of Fig. 5 = $rmnpq^3h$ lbs. per in.². If the pole distance in Fig. 6 = h_1 in., the scale of ordinates for Fig. 7 is 1 in. = $rmnpq^4hh_1$ lbs. per in., which is the final scale.

The maximum deflection, assuming a spruce beam, therefore equals

$$\frac{1.07 \text{ in.} \times rmnpq^4hh_1}{E} = \frac{1.07 \times 1{,}000{,}000}{1{,}600{,}000} = .67 \text{ in.}$$

As frequently the loading is such that the bending moment on a beam can be readily calculated and plotted, it is possible to compute and plot the M/I curve directly. In such a case the construction of the force polygon for the loading curve and the moment equilibrium polygon can be omitted, thus simplifying the work. Let s be the scale used in plotting the computed values of M/I. It will equal the scale $mnpq^2h$ and replace it in subsequent scales. For instance, the scale for the ordinates to the deflection polygon becomes 1 in. = rsq^2h_1. With this exception the remainder of the work is the same as before.

Any difficulty there may seem to be in determining the correct scale factor is removed when it becomes clear that in all the scaling and plotting the ordinates and areas dealt with are true lengths and actual areas in inches and square inches, respectively. As each diagram is drawn, the scale that was used for it is noted, and not until the deflection is obtained is it necessary to compute the scale, which is therefore done in a single operation.

The graphical method can be roughly checked by using an average value for the moment of inertia of the beam and computing the deflection by the usual deflection formulas.

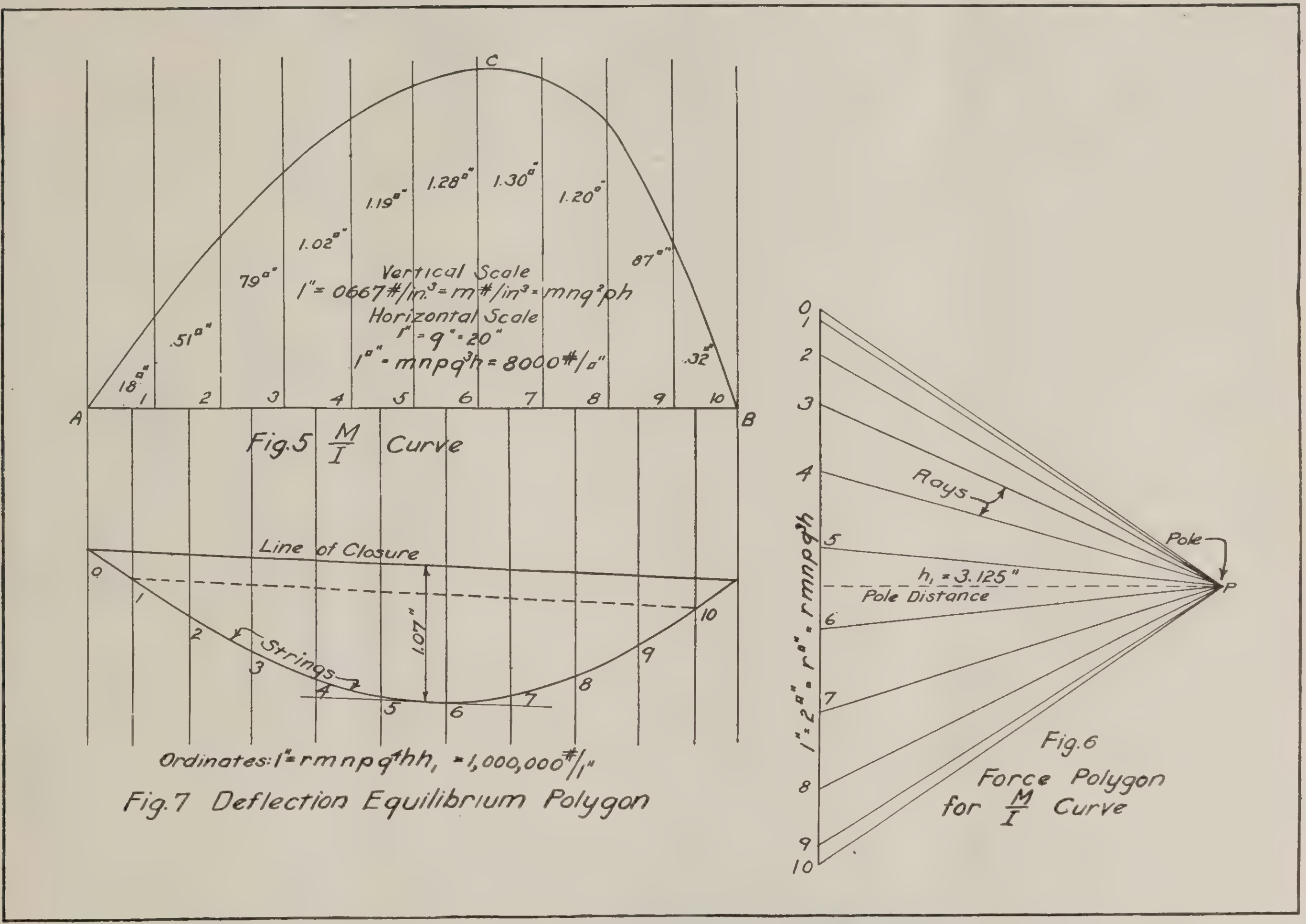


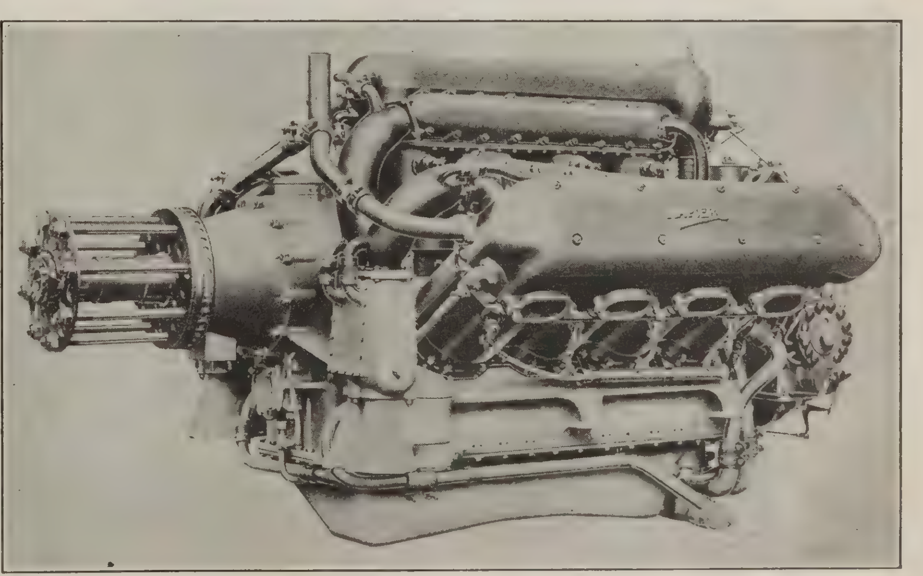
Fig. 5 M/I Curve

Fig. 7 Deflection Equilibrium Polygon

Ordinates: 1" = rmnpq⁴hh₁ = 1,000,000#/1"

Fig. 6 Force Polygon for M/I Curve

THE 450 H. P. NAPIER AERO ENGINE



It was during the war period that Napiers first conceived the idea of manufacturing a high-powered aero engine of light weight, as they foresaw that the supremacy of the air could only be maintained by having aero engines capable of developing a very high power.

This aero engine was tried with great success towards the latter end of the war by the Royal Air Force, but its greatest sucesses have been gained in commercial aviation.

Besides being the first aero engine to reach six miles up in the air, it has to its credit twenty-three British records for speed, and also the first and fastest nonstop flight from London to Madrid.

In the Napier aero engine there are combined all the qualifications essential to ensure permanent success, viz., compactness, light weight per horsepower developed, reliability, and economy in use of fuel and oil.

The enclosed photograph will give some

(*Continued on page* 29)

CENTRAL AIRCRAFT TYPES

THE future of commercial aviation is bound up in those firms who foreseeing the possibility of the aeroplane in civil life, have in the few brief months since the armistice been able to place upon the market a variety of types designed and built for purely peaceful purposes. Foremost amongst such firms in Britain is the Central Aircraft Company, at whose works in High Road, Kilburn, London, a highly skilled staff are engaged in building their celebrated "Centaur" type of machines. One of the pianoeers of the aircraft industry, they began constructing aeroplanes in 1909, and soon secured a leading position as designers and constructors of machines of the highest class.

"Centaur" machines are now constructed for civil aviation, and all those who are interested in flying should make a point of getting in touch with this firm, whose reputation is second to none in the industry, and who are at the present time turning out the cheapest machines in the world, compatible with the highest class workmanship.

The "Centaur 1A" is a 300 h.p. Hispano-Suiza engined single seater biplane with a factor of safety of 8 to 1 maintained throughout, construction of the simplest and sturdiest, embracing strength and lightness to a remarkable degree, with workmanship and finish of superlative excellence. Originally a fighting scout, it has been adapted for civil flying without in any way detracting from its speed and climb. The view from the pilot's seat is exceptionally fine, the rear spar of the plane being on a level with his eye, and the lower wings are cut away near the body, thus permitting him to see vertically downwards. This machine is ideal for the speed-loving enthusiast who wishes to be transported from place to place in the shortest possible time. It has a speed range of 50-160 m.p.h., with a climb of 1000 feet a minute on a gasoline consumption of twenty gallons.

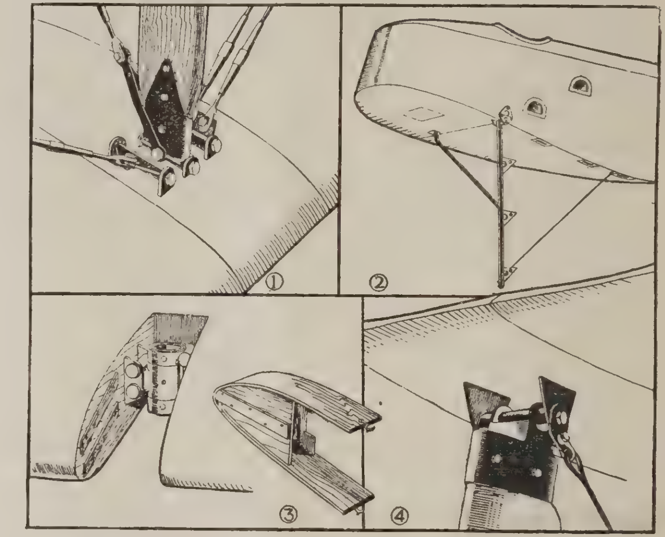
The "Centaur 2A" is a nine-seater 320 h.p. Beardmore twin-engined biplane, admirably adapted for passenger carrying and commercial use. The machine provides accommodation for pilot and eight passengers, who are seated within a luxuriously appointed and electrically warmed cabin with sides of non-splintering glass, or when passengers are not carried 2,000 lbs. of goods or mails. It has a speed range of 40-100 m.h.p on a petrol consumption of twenty-five gallons and with a full load of passengers or freight the tankage capacity is three hours. This machine possesses the same excellent flying qualities as the smaller models, and is constructed with folding wings, which enables it to be housed in a small hangar or shed.

The company also make a nine-seater 460 h.p. Siddley twin-engined hydro biplane, type "Centaur 2B". It is similar in construction and design to the "Centaur 2A", but is fitted with two floats instead of the usual landing gear.

The "Centaur 4" is a 100 h.p. Anzani engine biplane, specially designed and constructed for training purposes. It is used exclusively at the Central Aircraft Company's School of Aviation, Northolt.

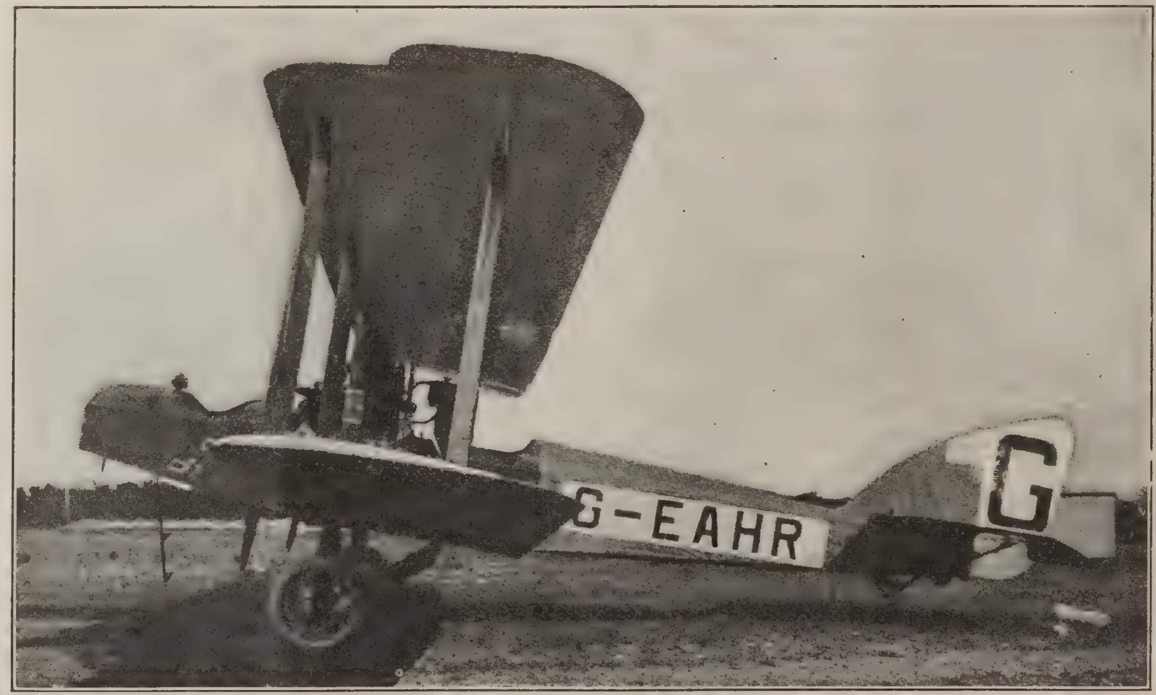
The "Centaur 5" is a two or four-seater 110 h.p. Anzani engined biplane, designed and constructed for touring and sporting purposes. Simplicity and strength of construction are the outstanding features of this design, whilst by the employment of folding wings, a great objection to the present-day type of machine, the large amount of space required for storage has been effectually overcome. It is inherently stable, yet exceptionally light and easy on the controls, possesses a wide range of speed and a landing speed of thirty miles an hour, a very important consideration to the private owner. The speed range is thirty to eighty m.p.h., on a gasoline consumption of eight gallons.

"Centaur 5A" is a modification of the well known sporting

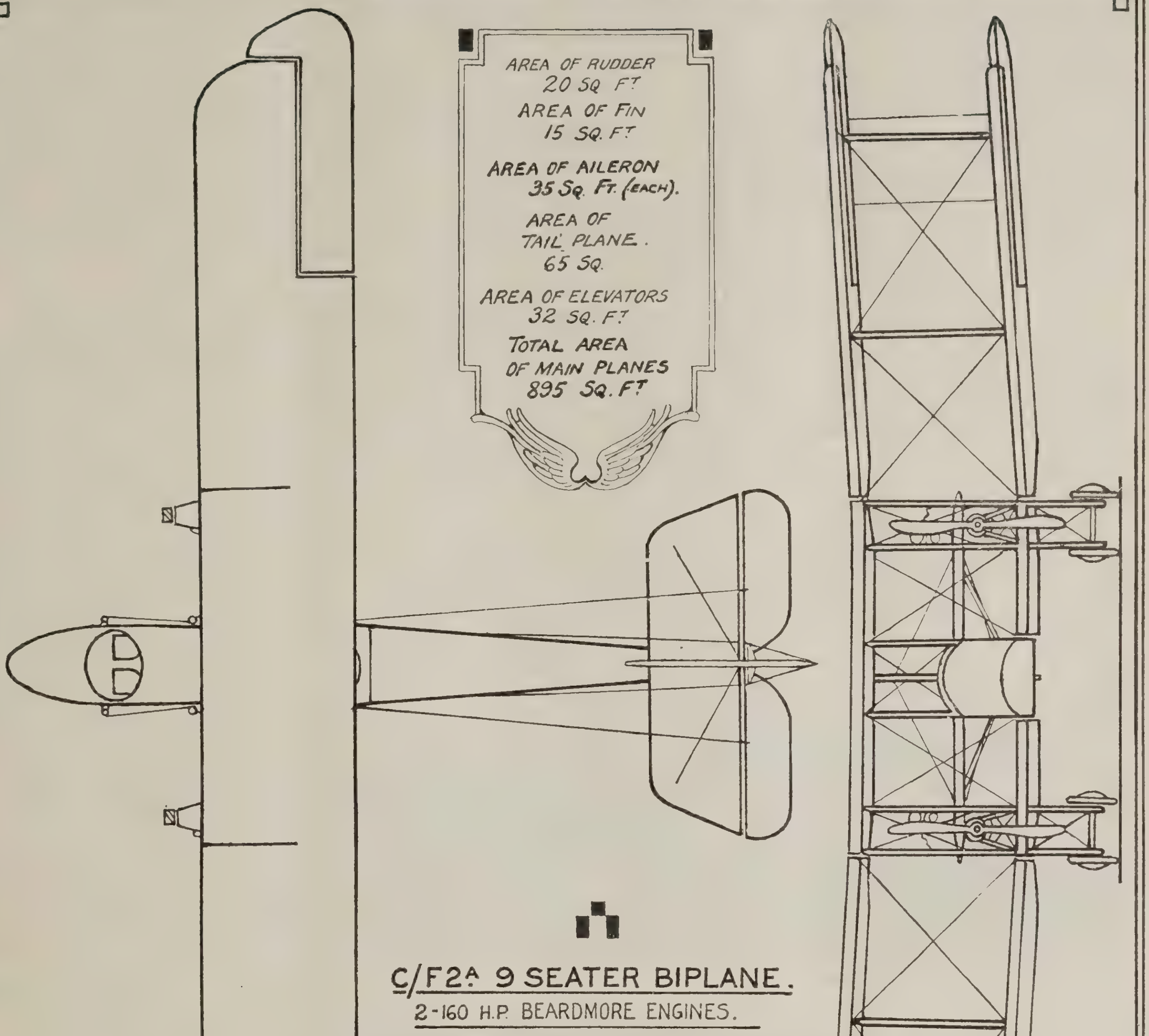


SOME CONSTRUCTIONAL DETAILS OF THE CENTRAL AIRCRAFT CO.'S 9-SEATER:

1. The hinged interplane strut attachment. 2. Access to the two-front seats is by means of steps secured to a tube which is drawn up during flight. 3. The spar joints are of the hinge type as the wings are made to fold back. 4. The attachment of the undercarriage struts to the bottom spar



The Central Aircraft Co.'s 9-Seater



C/F2A 9 SEATER BIPLANE.

2-160 H.P. BEARDMORE ENGINES.

or touring model "Centaur 5," adapted as a seaplane. It has the main central float and subsidiary floats fitted to the wing tips and rear end of fuselage to meet any tendency to rolling or pitching, when on the surface of the water. It has a speed range of thirty-eighty m.p.h. on a petrol consumption of eight gallons, with a tankage of three hours.

"Centaur 6" is a 230 h.p. Siddley Puma engined three or four-seater amphibian biplane. This machine is probably unique. Realizing the immense advantages to be gained were it possible for an aeroplane to alight equally well on either land or water, the company have, by means of careful design and experiment, successfully produced an amphibian biplane. By an ingenious arrangement of a sliding collar and hinged axles, it is possible at will either raise or lower the ordinary landing wheels, the float remaining permanently fixed. For alighting upon or taking off from the water the wheels are raised clear, whilst for ordinary landings on terra firma, they are released so as to project below the float, being automatically locked in position. The machine is provided with an enclosed and comfortably upholstered cabin for passengers, whilst the pilot occupies an open cockpit ahead of them, having an excellent view in all directions. The folding type of wing is employed, enabling the machine to be readily housed in a comparatively small space. The fuselage or body of the machine is remarkable for its almost entire absence of metal fittings, thus greatly reducing liability to corrosion due to the action of salt water, etc. It has a speed range of 45-105 m.p.h. and a gasoline consumption of fifteen gallons, with a tankage capacity of seven hours. This machine is largely in demand by companies who have undertaken contracts at the fashionable watering places to provide joyriding machines during the season.

MARTINSYDE AEROPLANES

Martinsyde Limited is one of the few pioneer British firms which have been occupied since flying came into being in the design and construction of aeroplanes.

Some of the commercial models are distinctly interesting, and following are some facts concerning them:

Martinsyde Sporting Model

This machine is an adaptation to commercial purposes of the famous Martinsyde "Buzzard," the super-fighting scout, which just before the armistice broke all records for speed, climb and power of manœuvre.

It has now been arranged—by discarding the various guns, instruments, etc., peculiar to war purposes—so that it can be used as a high-speed single-seated machine, suitable for touring and for any purpose where it is necessary to cover long distances in the shortest space of time.

Martinsyde "A" Type

The dimensions of the machine are as follows: Wing span, 32 feet 9 inches; overall length, 25 feet 6 inches; height to tip of propeller, 10 feet 4 inches.

The machine is fitted with the Rolls-Royce Falcon engine, developing about 280 h.p., with a load of 350 lbs. over and above a full load of fuel sufficient for two and one-half hours' flight, or approximately 300 miles.

The cruising speed, using about two-thirds full power, at 5,000 feet is 110 miles per hour, while the machine lands easily at forty-five per hour.

Martinsyde Type A

This machine was primarily designed as a passenger and cargo-carrying machine. Its approximate dimensions are as follows: Span, 43 feet; overall length, 27 feet 6 inches; height to tip of propeller, 10 feet 10 inches. It may be fitted either with a Rolls-Royce Falcon engine or a Rolls-Royce Eagle engine. With the former its carrying capacity, exclusive of fuel, is 1,800 lbs., while with the latter its capacity is one ton. It is proposed to use the Falcon engine for the passenger-carrying machine, while the Eagle engine will be utilized for the cargo-carrying machine and for greater weights. Both these machines are arranged for a six hours' fuel capacity at a mesne speed of 100 miles per hour, this speed being regarded as the cruising speed of the machine. It should be understood that this speed is obtained by utilizing only two-thirds of the full power available. The passenger-carrying machine with the Falcon engine would be able to seat, in addition to the pilot, two, three or four passengers, according to the quantity and weight of luggage or load it is desired to carry. The cargo-carrying machine with passengers' seats taken out, is available for carrying nearly one ton of cargo. The landing speed of this machine is between thirty-five and forty miles per hour. It should be noted that this machine has been specially designed for commercial purposes, and therefore no attempt has been made to obtain phenomenal rates of climb. It will climb at the rate of 500 feet per minute with full load; at the same time its low-landing speed will enable it to be landed with ease under practically any conditions.

Army Air Service Designs Big Armored Planes

Washington.—The future programme of the Army Air Service includes the manufacture of great armored aeroplanes—really flying tanks—carrying cannon, machine guns of various calibres, grenades and bombs.

The Air Service has completed designs and models of this type and many other modern planes, but production has not been possible on account of shortage of funds.

The use of army aircraft in the operations of war, as prescribed by the Army and Navy Joint Board and approved by the Secretaries of War and Navy are as follows:

(A) As an arm of the mobile army.

(B) Against enemy aircraft in defense of all shore establishments.

(C) Alone or in co-operation with other arms of the army or with the navy against enemy vessels engaged in attacks on the coasts, such as:

1. Bombardment of the coast.
2. Operations preparatory to or of landing troops.
3. Operations such as mine laying or attacks on shipping in the vicinity of defending ports.

The primary mission of an air service is to seek out, attack and destroy the air force of its enemy. It is essentially an offensive arm in its tactical application, and all air services should be organized with that end in view from a strategical standpoint. With a proper organization an air service can be brought to bear against an enemy with much greater rapidity than any other arm.

Aside from the sample equipment the Air Service has no service planes on hand capable of coping with a first class antagonist.

Martinsyde Single Seater

NAVAL *and* MILITARY AERONAUTICS

Aero Squadrons Sent to Hawaii

Washington—The Third and Twenty-first Balloon Companies of the Army Air Service have been ordered to proceed from Ross Field, Arcadia, Cal., to Hawaii for active service. Those two companies are reported as fully trained and equipped for overseas duty. They will sail from San Francisco on the first available transport.

The personnel of each company consists of four air service officers and 170 enlisted men. Only enlisted men who have at least two years to serve will be sent to Hawaii. Heavier-than-air squadrons already are on duty in Hawaii.

Naval Officers to Fly Scout Planes

Six naval officers from the air service detachment at Rockwell Field, San Diego, a part of the Pacific fleet aerial corps, arrived Monday at March Field for instruction on SE-5 and Thomas-Morse scout planes. Their course will extend over a period of four or six weeks.

British Dirigible R-80 Nearly Completed

The R-80, the new British rigid airship is just about completed and will be handed over by her manufacturers, Vickers, Ltd., to the Admiralty. The R-80 embodies the latest improvements in British design. She is 535 feet long, has an overall height of 85 feet with a beam of 70 feet.

Her total lift will be 76,000 pounds or 38 tons, and her four motors, each of 240 horsepower will give her a speed of over 65 miles per hour. A crew of fifteen or sixteen will be necessary to operate her.

2nd Aero Squadron Holds Dinner

An aviation dinner was held recently by the 2nd Aero Squadron at the Fort Mills Post, Philippine Islands.

Music was furnished by the Philippine Scouts band, and the dinner was followed by a dance.

The officers present were of the 2nd Aero Squadron which recently reached the Philippines.

Lieut Brown Takes Off on Runway of Boxes

Recently Second Lieut. Ray W. Brown, A.S.A., in compliance with Director of Air Service orders, prepared to take off for Washington, D. C., with a D. H.-4 plane, to be delivered to Bolling Field. The snow was twelve inches deep on the field. Lieutenant Brown had a wooden runway made of aeroplane boxes, six sections of which were laid out in track form on the field. The plane was placed with the front wheels just barely resting on the end of the track. The motor was warmed up in this position and when ready Lieutenant Brown opened the motor full, allowing the plane to run on the runway and immediately upon gaining speed was pulled off the ground about one foot, then allowing it to gain sufficient flying speed to continue with the climb. This trip demonstrated the feasibility of delivering material from a supply depot to the fields within the zone, as six fur-lined flying suits, for use of officers at Washington, D. C., were carried by Lieutenant Brown and delivered at Bolling Field with the plane. The trip was made in one hour and seven minutes.

Capt. Donaldson Commanding 94th Squadron

Captain J. O. Donaldson, A.S.A., is now commanding the famous 94th Aero Squadron in place of the late Captain Field E. Kindley, A.S.A.

Captain Donaldson is a military aviator with several decorations, and as squadron engineer officer for the 95th Squadron has shown himself an efficient and capable officer.

To Convert Planes Into Ambulances

Washington—Orders have been given to convert four D. H.-4 army aeroplanes into aeroplane hospital ambulances, and A. V. Verville, aeronautical engineer at McCook Field, Dayton, Ohio, has completed a design for the model.

Each machine will be equipped with two basket litters for patients and accommodations for a pilot. The need of this type of plane, the department says, has been demonstrated by the Mexican border patrol work.

Aeroplanes Escort Col. Miller's Train

A train that carried Col. Archie Miller from Mineola to Manhattan recently on his way to assume command of Kelly Field, Texas, was escorted by a half dozen aeroplanes as a mark of honor. The pilots flew over and around the train almost the entire distance to New York.

Col. Miller was accompanied by his family. He has been in command of Mitchel Field since August, 1918. He will be succeeded by Lieut-Col. W. L. Booth, Jr.

School at Kelly Field to Teach Parachute Jumping

Arrangements are being completed for the installation of a course in the art of parachute jumping at the Air Service Mechanics' School at Kelly Field, Texas. A number of trained men sent from the Engineering Division of the Air Service are on their way to Texas to act as instructors. It is of interest to state that every man at the Air Service School has applied to take this course.

Air Service to Train Foresters for Forest Observation

As the Army Air Service is hard pressed for trained observers and pilots it has been decided to train twenty-two civilian foresters in Forest Fire Observation from aeroplanes.

The Director of Air Service has authorized a school to be opened at March Field, Riverside, California, and the personnel from the Forest Service be given a course of instruction through a period of six weeks, on the condition that the operation of the school and training will not entail any expenditure of Air Service funds. This will involve but a small expenditure on the part of the Forest Service.

The Air Service will continue to furnish aeroplanes and pilots for the regular Forest Patrols while the second man in the aeroplane will be the civilian observer.

The Air Service has maintained a regular schedule of patrols since June, 1918. Up to the present time 570 fires have been discovered by the observers.

The Roving Marines Band at the Syd Chaplin Flying Field

FOREIGN NEWS

Flying Allowances in the Belgian Army

Military pilot aviators in the Belgian army now receive the following monthly allowances—comparable in nature to the flying pay formerly given in the British Service. To officers of all ranks, 200 fr.; to subalterns during the first year after taking of the pilot's certificate, 100 fr.; to subalterns during the second year, 150 fr.; and from the third year 200 fr.; officer observers 150 fr.

An Italian Airship Service

A service of airships is to be started shortly between Italy and Tripoli, under the management of the Grutter firm. The first starting points will be Naples and Palermo.

Italian Government Training Pilots

Government schools for the teaching of distinctively civilian aviation are to be opened at Turin, Milan, and Naples; at this last seaplanes are to be used.

A civilian and military course for training pilots is being started at Cameri.

Mexican Government Establishes Aerodrome at Piedras Negras

An aerodrome has been established by the Mexican Government at Piedras Negras, directly across the Rio Grande from Eagle Pass, Texas. The detached Flight which is on duty there consists of one 1st Captain, Five Lieutenants and one Cadet with the necessary number of Mechanics and other enlisted personnel. Five biplanes and one monoplane comprise the equipment.

The biplanes are of native manufacture and are of very light construction, having approximately 40 feet wing spread. They are equipped with Hispano Suiza motors, 150 H.P., with radiators which are very heavy. The ships have a horizontal speed of about 70 M.P.H., but climb at a fast rate on account of their light construction and an exaggerated wing camber.

No armament is used but a hole is cut in the bottom of the fuselage in the rear cockpit for the use of light bombs and machine guns.

The monoplane is a French Bleriot. The planes are reported to be suitable for stunting. The personnel is commanded by 1st Captain Hermanes.

Lieutenant Ian McGregor, Canadian Ace, Dies

The noted Canadian ace, Lieutenant Ian C. McGregor, V. C., died at Saranac Lake, N. Y., as the result of wounds suffered in an air battle during the World War. He was ranked as one of the finest of the Canadian aviators and is officially credited with bringing down nearly a score of Hun fliers.

Caproni on Way to Tokio

Rome—The Caproni aeroplane piloted by Lieuts. Ferrari and Masiero arrived at Bender-Abbas, a seaport on the Gulf of Persia, and continued on its way to Tokio.

British Air Ministry Announces Hounslow Aerodrome Open to Night Flyers

The British Government is doing all within its power to encourage civil aviation. It has placed Hounslow aerodrome at the disposal of Civil Aviation companies and announces the following to flyers:

Hounslow Aerodrome is temporarily equipped for night flying.

Each evening for a period at sunset a lighthouse in the aerodrome will give three flashes every ten seconds in the following order: Flash, one second; eclipse, one second; flash, one second; eclipse, one second; flash, one second; eclipse, five seconds. Ground searchlights and landing flares will also be displayed.

These lights will be proveded at any time during the night, if notification is made to Hounslow that machines intend to land, or if a machine is heard in the air.

Air Plans for Pacific Coast of Canada

Major MacLaren, a member of the Canadian Air Board, who has been investigating the conditions affecting the promotion of aviation on the Pacific Coast, has recommended to the Air Board that air stations should be established at several points on the coast and in the interior.

He advocates the use of the aeroplane for patrolling the fishing grounds and forests and for exploration, and urges that there should be a complete chain of wireless ground stations.

A Flying-Boat Service for Peru

President Leguia was the first passenger at the formal inauguration of the Handley Page commercial flying-boat service at Ancon.

After half an hour's flight over the Pacific Ocean, the President predicted a magnificent future for aviation in Peru. He declared that Peru was more adapted to, and had greater need for, aviation than any other country in the South American continent.

An Aerial Service Through Alberta

Major A. G. Lincoln, ex-R. A. F., is making a survey of an aerial route from the United States boundary to Fort Vermillion for the Canadian Air Board. Major Lincoln is endeavoring to collect sufficient data to warrant the establishment of an air service on the route at an early date, and he hopes to show in his reports that the undertaking may be promoted on a self-sustaining basis.

The service should be used for police and forest patrols, school inspections, map-making and railroad surveys.

Major Lincoln is of the opinion that a survey of the mineral resources in the Peace River area alone would pay for the service in one year. It now takes two months to convey mail from Peace River Crossing to Vermillion. By air it could be taken in a day. A photographic map of 25 townships could be taken in one day, and this may be worth the cost of the whole service in putting settlers into the great north country.

The distance from the U. S. boundary to Fort Vermillion is some 1,200 miles along the eastern slopes of the Rockies. The route is now impossible, except with the use of pack horses. But the establishment of a series of aerodromes would render communication by air quick and easy.

Appointment in China

Group Captain (Colonel) F. V. Holt, R.A.F., has been appointed Aeronautical Adviser to the Chinese Government, and is leaving for China to take up his duties.

Aerial Post Between Italy and Greece

The Italian Government has informed that of Greece that in accordance with the regulations of the convention recently agreed upon by the two countries, an aerial post will link Italy with Greece. Two aerodromes are to be constructed—one at Corfu, the other at Brindisi.

Plan for Large Hydro-Aeroplanes on Mediterranean

There should be a great future for the large hydro-aeroplane in the trans-Mediterranean service, where the ability to start from the sea surface and alight thereon would in many circumstances be indispensable, and where at the same time the distances are not so great as to exceed the range of these heavy craft.

An outline design is given of a 2,500 h.p. flying boat to carry 4,200 k.g. useful load, based upon existing designs and using a new type of motor stated to be now under construction. The estimated detailed weights, etc., are as follows:—

Total power (4 motors)	2,400 h.p.
Total structure weight	23,000 lbs.
Weight of fuel (to cover 625 miles in 6 to 8 hours)	7,500 lbs.
Weight of crew (five men)	880 lbs.
Weight of navigation material	1,100 lbs.
Useful load (minimum)	9,250 lbs.

The machine is a triplane with engine nacelles, each carrying two engines with one pusher and one tractor airscrew, supported on the middle plane. The boat hull gives ample accommodation for pilot, mechanics, wireless operator and about thirty passengers.

Heliopolis Great Aeroplane Center

Cairo.—Col. Van Rynvild got away safely from the Heliopolis aerodrome in his new Vickers-Vimy plane and arrived at Halfa, 617 miles from Cairo.

While preparations on Col. Van Rynvild's and Major Brackley's planes and on the Vickers-Vimy, which Captain Welsh will shortly pilot on behalf of the Royal Flying Corps, were at their height an aeroplane appeared overhead, and on coming to earth it turned out to be the single-engined D-59, piloted by Lieutenants Mackintosh and Parer, who left Hounslow, London, with the intention of flying to Australia.

A little later from one of the hangars there was pulled out a giant aeroplane. Presently up drove two cars, from one of which stepped out Lord Milner, Mr. Ingram, assistant secretary to the Milner Mission, and Air Commodore Groves, who inspected all the machines, donned his flying kit, climbed into the giant Handley-Page and flew south to Assuan, whither the D-59 had preceded it. The scene struck every one, and as one of the senior officers remarked, "Today more than ever Heliopolis appears to be becoming an aerial center in the truest sense."

A Successful Airship Company in Germany

The airship company D.E.L.A.G. has now carried more than 140,000 passengers without a single fatality. As this company began operations in June, 1910, with the "Deutschland," it has created a wonderful record.

The "Hansa," which made her first trip on July 30th, 1912, was handed over to the army on the outbreak of war and used as a school ship, after a very useful civil career.

The "Viktoria-Luise," which was launched on Feb. 14th, 1912, was used during the war as a naval school ship. Both these airships were still in use at the end of 1916.

The "Sachsen," which first flew on May 3rd, 1913, was also, in August, 1914, handed over to the army, and was used as a combatant ship, raiding Antwerp three times in September, 1914. Early in 1915 she was lengthened and was then sent to the Russian front, where, in the summer of 1915, she carried out a series of raids on Vilna, Bialystock, and other places.

The latest D.E.L.A.G. is, as all the world knows, the "Bodensee." This airship has carried out her appointed voyages on 60 days out of 63, and carried some hundreds of passengers. So popular are the flights that seats have had to be booked weeks ahead. Also, and this is a very important point, a very fair profit is being made.

Air Navigation on the Continent

The directors of British, Danish, Dutch, Swedish and German aerial navigation companies recently held a meeting in Copenhagen and discussed air routes which it is proposed to establish when conditions permit.

Aerial Services in Peru

It is reported that Messrs. Vickers are negotiating for the establishment of a regular aviation service between Payta (on the Peruvian coast) and Iquitos (on the frontier of Ecuador, and some 600 miles from Payta), to become effective before the end of the year.

Bombs for Whales

The Breton fisherfolk round the Camaret coast and Cape Finisterre, who look to the sardine to provide them with their livelihood, have been so much worried by the depredations of a large number of whales, that they have at last petitioned the Under-Secretary of State to send them a seaplane with a supply of powerful bombs. But the remedy may prove worse than the disease.

French Prizes Awarded

The following awards have been made by the Aero Club of France:

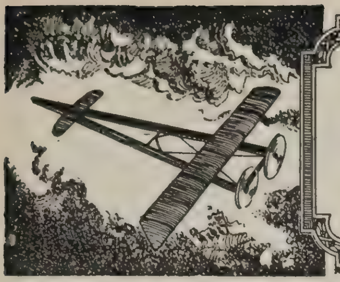
Prize of 7,000 fr. and the cup presented by the French Aeronautical League—Lucien Bossoutrot, for his non-stop flight from Paris to Casablanca with seven passengers on the Farman Goliath, on August 11, 1919.

Height record (pilot and two passengers), on December 20, 1919, at Villa Coublay—Henri Roget, 5,800 meters (19,319 ft.).

Henry Deutsch Cup (provisional award—Sadi Lecointe, for covering the stipulated circuit at a speed of 266 kilometers 314 meters (165⅓ miles) in an hour on a Nieuport-Hispano on January 3 last.

Lowers Rates in England for Aerial Service

Following the example of Handley-Page Transport, Ltd., Aircraft Transport and Travel, Ltd., have reduced the rates for carrying parcels by air. They state that experience has now made it possible to effect sensible reductions in the rates for parcels carried between London and Paris.



ELEMENTARY AERONAUTICS
and
MODEL NOTES

By John F. McMahon

MODEL BUILDERS, ATTENTION!

The Model Editor will help you with suggestions or answer your questions in regard to model aeroplane construction any time you get into difficulty, so do not be backward in writing when necessary.

We would also be pleased for any suggestions or photographs that would be of interest to readers.

Remember that this page is your page and you should become a part of it. Let us hear from you.

Model Gliders

A few years ago the model flyers of the United States developed a motorless aeroplane that was capable of long flights without power and strong enough to stand the most severe landings, which gliders are subjected to.

The Aero Science Club of America, then one of the leading model aeroplane clubs of this country, held a series of contests for gliders and a well known aeronautical man offered liberal money prizes to the winners, and the writer won a prize for the longest duration flight which lasted well over a minute.

These gliders were started from a hillside bordering on flat ground and launched into the wind with a gentle start (The rules did not permit throwing the model) and they would start forward with an abrupt nose dive for about fifty feet until the proper gliding speed had been reached when they would in most cases start to climb to a considerable height and continue on. The flight would resemble that of a gull in winding circles, following the most advantageous currents for sustention in the air. Many times the little gliders would almost touch the ground after being in the air some time and then when the flight would seem to be near an end, they would run into an up current of air and climb gracefully to higher regions.

Many lessons are taught by these motorless aeroplanes and that was the purpose of the man who offered the prizes, who was at that time experimenting with models in order to arrive at the proper combination to use, to get the greatest efficiency out of the aeroplane or to fly with the least horse power and if possible no engine at all.

The older readers will remember the Wright's endeavors along these lines with a special glider that would hover in the air over a spot for long lengths of time, rising and falling according to the currents and the will of the pilot.

The glider shown in the accompanying drawings is large and for that reason can be built stronger and stand more abuse than the smaller types. The one shown will make very long flights and when balanced correctly can be flown on flat ground as well.

Frank Schober, one of the first model flyers in this country and a record holder, built one of this type at Mineola, L. I., and while flying it there, took a large piece out of one of the hangars. The glider turned after being pushed up by a current of air and dived from a great height, hitting the hangar and doing considerable damage. For that reason, I would advise the builder to be careful when starting one on its way as it is possible that a gust of wind would cause it to loop and crash down on some bystander, but this could not possibly happen if flown from a hill side.

As stated before the glider is built strong and rugged and for that reason the parts used in its construction are large and oversize to withstand the landing shocks and also to bring the weight up, which is desirable in this particular glider.

Body

The body is made of white pine and is carved from a block 4¼"x4¾" to the shape shown, after which it is sand papered to a smooth finish. The nose is then slotted ⅛" and a skid of ⅛" veneer cut to the shape shown is inserted and glued fast. Two large holes are drilled through from the sides and large plugs of lead inserted to make the nose heavy.

The body should be painted and varnished off, if preferable the natural wood varnish, and polished to cut down resistance.

Tail and Rudder

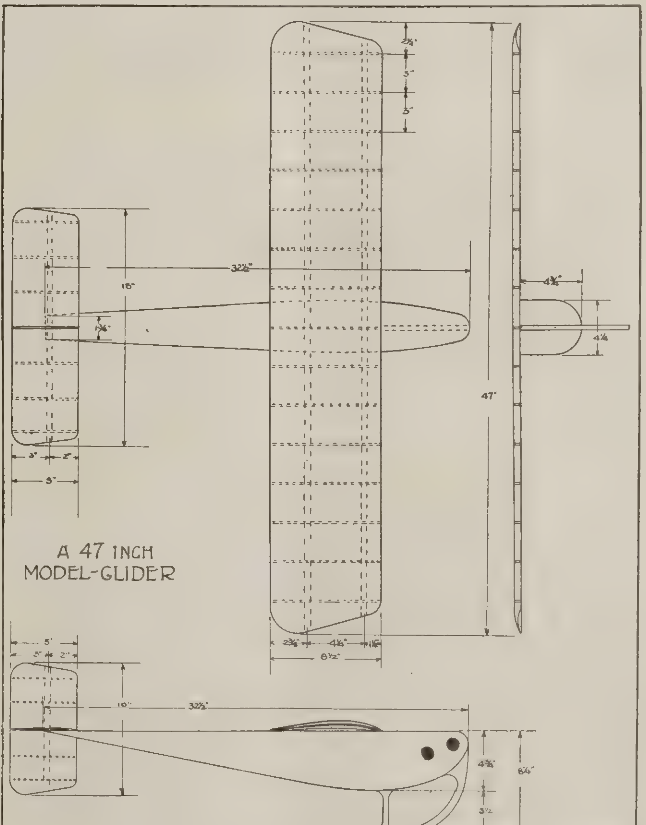
The tail and rudder are made in one piece and can be lighter than the rest of the machine because these parts do not come in contact with the ground so often, and in fact should be light to help bringing the center of gravity nearer to the nose.

The tail is built up of bamboo and spruce. The bamboo is cut thin (about ⅛") and rounded for use on the edges. The main spars are spruce or fir. The ribs should be solid type, that is cut from 1/16" thick wood and not built up from bamboo strips. The ribs are streamline in shape the greatest thickness being ½" which occurs 2" from the entering edge. The rudder is constructed in the same way and the two are crossed forming one unit. When finished a cheap lining such as used by dressmakers or a substitute China silk is is glued or sewed over the frame, and doped. The rear of the body which forms a wedge shape is also slotted and the rudder inserted. This permits the tail to lie flat on the top of the body and can be fastened permanently in place.

Main Plane

The main plane must be made strong because it generally comes in contact with the ground upon landing and in most cases receives very severe usage.

The Spars must be large in cross section, that is about ⅜" square, the ribs should be cut from 3/32" thick wood. The entering and trailing edges are ⅛" bamboo. The covering is the same as used on the Tail works.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Useful Josh

"You can't get an intoxicating drink except with a doctor's prescription," remarked Mrs. Corntossel.

"Yes," replied her husband. "I was jes' thinkin' of writin' to our boy Josh tellin' him to drop aviation an' study medicine."—*Washington Star.*

Pilot: "These are gloomy times."
Observer: "No wonder, with everybody out of spirits."

C. O.: "It's your duty as officer of the day to keep the log."
Flying Looie: "But I don't know anything about lumber."

Heard on the Flying Field

"Do you shift gears like an automobile?"

"How do you pump up the wings?"

"What mileage do you get from your tires?"

"Does that stick in front fan you in hot weather?"

"Is the power applied to the wheels by chain or shaft?"

"Have you got an emergency brake?"

"If I go up, will you run real slow and stay close to the ground?"

"What is that steam line I hear so much about? I want some for my Ford."

Why He Wanted Strong Ones.—"Gimme three cigars," ordered the aviator in the Irish Air Service, shoving a quarter across the counter.

"Strong ones or mild?"

"Gimme the strong ones. The weak wans is always bustin' in me pocket."—*The American Legion Weekly.*

Difference of Opinion.—Girl Watching Aeronaut.—"Oh, I'd hate to be coming down with that parachute."

Mere Man—"I'd hate to be coming down without it."—*Chaparral.*

Letter From Privut Pete

My dere Mister Editor:—A cadet by the name of Jack London, (no relation to the author), has addressed a communication to some bird in Washington seeking advise as to whether or not it is possible to fire with a machine gun through a propeller while the ship is in flight. Seems as though his letter wasn't sent through channels and when ever the Sergeant Major hasn't no basket in which to place stray correspondence he sends it over to me.

Jack said that the cadets were all split up over the matter. Something like these modern political parties—not sure of themselves. Anyhow a machine gun crew of said detachment got out an electric fan, threw her into high and proceeded to fire through the blades of said fan. Results—One No. 16 fan shot to hell, three mirrors in the barbar shop plum busted and the K. O.'s disposition considerable mussed up.

Bein' a buck private of course I haven't got no license offering any suggestions. But they ought to put a few of them flyin' men on guard detail fer a week or two to improve their eyesight. 'Taint safe with a lot a reckless like soldiers about shootin' promisculously just to settle some petty little argument. Take it for granted, Jack, "it can be done," but please save the electric fans—we'll need 'em badly this summer.

Speedily yours,
"PETE."

Something Loose

1st Aero-Radio Fiend—Y'know, there's something queer about my wir'less? Every time I put on the phones I hear a terrible rattling sound.

2nd Aero-Radio Fiend—Oh, what you hear is probably your loose-coupler!—*B. M.*

As it Happened

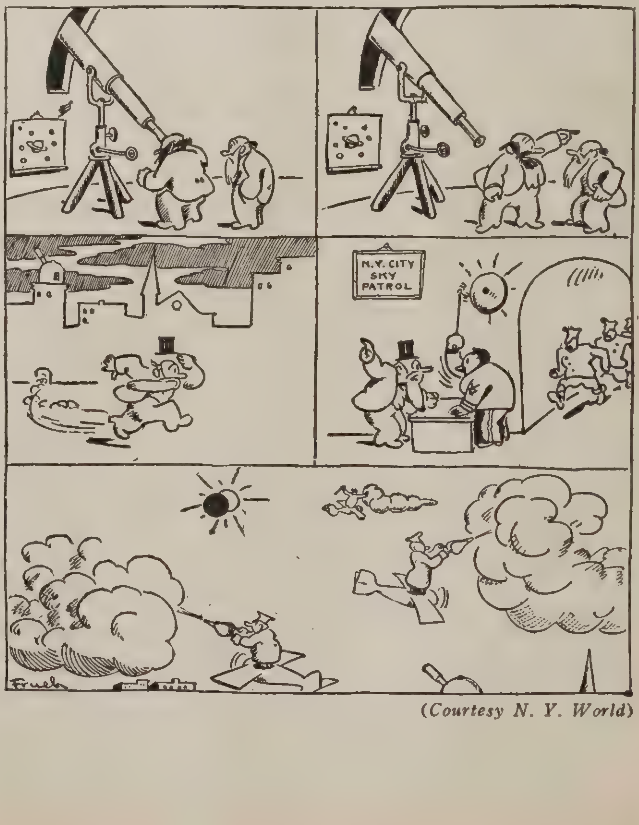
The aviator's wife was in tears. "What's the matter, my dear?" asked her friend.

"I'm worrying about George," she said. "He's been trying for a week to kill our cat, and as a last resort he took pussy up in his plane. He said he would take her up 2,000 feet and drop her over."

"Well, there's nothing to worry about," said her friend.

"Oh, yes there is," said the frantic woman. "George isn't home yet and pussy is."—*Johannesburg Star.*

Mayor Hylan's Sky Cops



(Courtesy N. Y. World)

Important Announcement to Aeronautic Engineers

Developments of tremendous importance in aero engines have occurred during the war period, and realizing that there is not available today an authoritative work of a thoroughly up-to-date character on aero engines, The Frederick A. Stokes Company has arranged with E. H. Sherbondy and G. Douglas Wardrop to prepare a comprehensive volume dealing with the principles and theory of aero engines, and describing completely all of the successful aero engines that have been developed during the war.

The volume will comprise at least 400 pages, of large size, seven inches by ten, permitting a very full discussion of every important phase of the subject and also the presentation of photographs and diagrams of a size to be of value to the designing engineer and student.

The below partial list of contents gives an idea of the scope of the work:

Historical and Theoretical Discussion

Definitions of Fundamental Notions of Mechanics and Thermodynamics; The Working of Processes of Internal Combustion Engines; Equation of Condition for Gases; The Behavior of Combustible Gases During Ignition; The Gaseous Mixture; Technical Analysis of the Four Stroke Cycle; The Work Available and Efficiency; Method of Calculating the Power of an Engine; The Power Variables; Characteristic Performance; The Effect of Altitude on Power; Variation of Power with Pressure; Altitude and Power; The Effect of Increasing Compression; Technical Analysis of the Power Required for Flight; The Power and Weight of Aviation Engines; General Theory of the Turbo-Compressor, The Sherbondy Turbo-Compressor for a 400 H.P. Engine; Technical Theory of a Turbo-Compressor; The Strength of Rotary Parts of a Turbo Compressor; Analysis of Stresses in the Blower Impeller; The Effect of Back Pressure in the Manifold; The Effect of Altitude on Fuel Economy With and Without a Compressor.

Engine Types

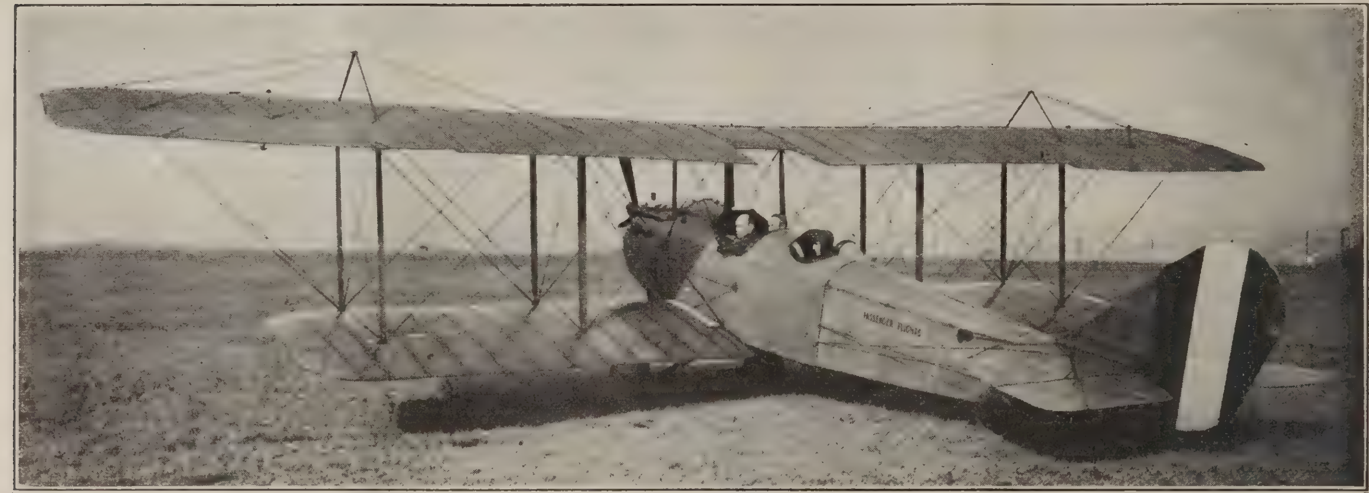
American:	Aeromarine Type L; Curtiss K-6 and K-12; Curtiss OX; Dusenberg 850 H.P.; Hall-Scott L-4; Hall-Scott 6-A; Hispano-Suiza; King 550; King-Bugatti; Lawrence; Liberty; Packard; Sturtevant; Union 120 H.P.
British:	A.B.C.; Beardmore; Cosmos; Napier; Panhard; Rolls-Royce; Siddeley-Deasy; Sunbeam; Zeitlin.
French:	Clerget; Gnome; Le Rhone; Lorraine-Dietrich; Peugeot; Renault 200-400-700; Salmson.
German:	Austro-Daimler; Basse-Selne; Benz 160-230; Maybach 300; Mercedes 180, 240, 260.
Italian:	Fiat Airship; Fiat 300; Isotta Fraschini; Lancia, Spa.

The work has been prepared for the purpose of having in one volume the complete information concerning all modern types of aero engines and an up-to-the-minute discussion of the principles of aero engine design and construction, so that the reader may be able to undertake comparative research without recourse to a formidable list of volumes and publications, which in any event could only supply him with more or less obsolete information.

To The Frederick A. Stokes Company,
Fourth Avenue, New York.

Please send me as soon as published a copy of the Textbook of Aero Engines, by Sherbondy and Wardrop, for which I enclose my check for ten dollars herewith.

(Signed)..



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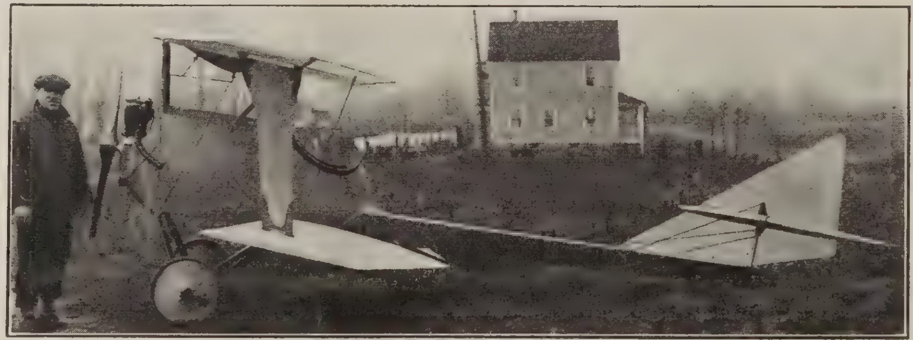

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(*Continued from page* 19)

idea of the compactness of the engine, which is on the "Broad Arrow" principle composed of three blocks of four cylinders each.

The weight of the engine dry, complete with the reduction gear, propeller boss, carburetors, induction pipes, is under 850 lbs., and in relation to horsepower developed this works out at only 1.89 lbs. per horsepower at normal revolutions. No pains have been spared to ensure the engine being as light as possible, consistent with the necessary strength required to obtain reliability.

Air Service Metal Supply on Sale

Washington.—Quantities of bronze bars, copper sheets, copper tubes, sheet steel, commercial steel bars, including steel bars, aluminum sheets, pig lead, zinc, spelter and chrome vanadium steel strips, are offered for sale by the United States Army Air Service. Quantities and complete information can be learned by addressing the Material Disposal and Salvage Division of the Office of the Director of Air Service, Washington, D. C., or by addressing any of the district offices of the Air Service, attention Material Disposal and Salvage Division, at Boston, Buffalo, Chicago, New York, Dayton, Detroit and San Francisco. The materials offered for sale are located in the various warehouses about the country.

Pacific Coast Flight in Seaplanes

At the invitation of Captain Henry C. Mustin, of the Pacific fleet naval air detachment, headquarters San Diego Harbor, Col. B. K. Yount, Major T. G. Lanphier, Major C. L. Tinker and Lieut. George McHenry, of March Field, Cal., were guests of the naval detachment on an inspection flight from San Diego to Santa Barbara.

Six multi-passenger F-5-L type seaplanes and one land division of Curtiss J-N-H's, piloted by naval officers trained at March Field, made the trip. About twenty-two officers comprised the personnel.

The flight from San Diego Harbor to Santa Barbara required about three hours actual flying time. The distance is approximately 180 miles.

Paid Off from Aeroplane

Private 1st Class Tankersley is probably the only man in the Army today who is paid off by aeroplane. He is the wireless operator at Hesters Ranch, about 90 miles down the Rio Grande River from El Paso, and is attached to the 104th Aero Squadron. To pay him off it is necessary to send the payroll down by a patrol plane, making the patrol from El Paso to Marfa, have it signed and returned and a few days later his pay is sent by the same means.

Sanitary Officer Uses Plane to Locate Insect Breeding Places

A new use has been found for the aeroplane by Lieut. McNutt, Sanitary Inspector at Godman Field, Kentucky. Lieut. McNutt decided that he would take a look at mosquito breeding places around Godman Field from the air. Accordingly arrangements were made with Captain Arthur Thomas to take the Sanitary Officer up for a flight to cover the territory. The officers were equipped with maps in cases and charted every water hole and pond that could be seen from the air. These officers located great numbers of insect breeding places in a very short time. Had this been done by the usual ground methods it would have consumed months of time.

By having all of these breeding places charted it enabled the Sanitary Officer to lay out a comprehensive plan for attack to his enlisted forces which will enable them to locate places without difficulty.

The method of locating these places from the air proved to be the most accurate and feasible method and is also very valuable in locating other places which are detrimental to the health of the personnel.

Aviators Making Records at Rich Field

The enlisted flyers at Rich Field are proving to be good flyers. They have been making regular flights in JN 4 Ds for the purpose of ascertaining the average altitude to which they might be able to fly. Sergeant Sheffield made the record which has not been equalled so far, reaching an altitude of 9,400 feet.

A great deal of anxiety is prevalent among the enlisted men. All are awaiting orders from Washington to ferry the balance of the Curtiss contract machines at Rich Field to Love Field at Dallas, Texas. Recently 127 of these machines were ferried down by these men and not a forced landing or accident occurred during the entire journey.

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First Regiment Armory

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The Florida-West Indies Airways Flying Boat en Route

New $2,000,000 Orders for Aeroplanes For Transportation, Sport and Pleasure

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scriptions: Domestic, $4; Foreign, $6. Entered as second-class matter March 25, 1915, at the Post Office at New York under the act of March 3rd, 1879

BONJOUR AMERICA!

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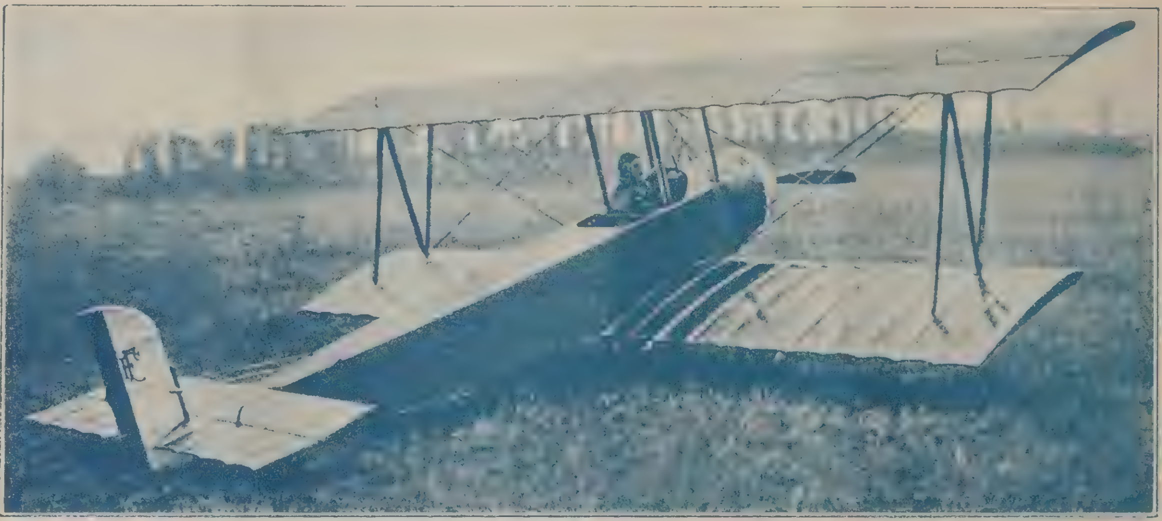

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Landing Speed 25-30 Miles Per Hour

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The mechanism is of the centrifugal type; the dial is black with radium graduations and pointer, and is calibrated in various speed ranges up to 5000 R.P.M.

The JONES AIRPLANE TACHOMETER is the lightest instrument of any type yet produced, and is geared to be driven at cam shaft or engine speed without extra attachment.

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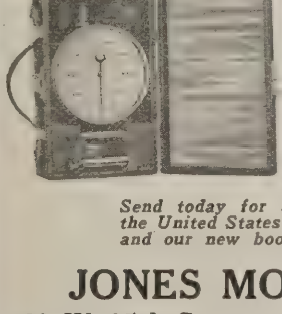

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AERIAL AGE WEEKLY

VOL. XI MARCH 22, 1920 NO. 2

TABLE OF CONTENTS

PAGE

New $2,000,000 Orders for Aeroplanes for Transportation, Sport and Pleasure 47

Aerial Mail Will Get Appropriations if "Pernicious Lobbying" is Stopped 48

The News of the Week 49

The Aircraft Trade Review 51

U. S. Aerial Mail 52

The Aeroplane Displaces the Automobile in the Motion Picture 53

Variation of Horsepower with Altitude and Compression Ratio 54

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures 58

Naval and Military Aeronautics ... 59

Foreign News 60

Elementary Aeronautics and Model Notes 61

Aeronitis 62

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When you start out on an automobile trip, you always enjoy yourself most when you have confidence in your car.

It's the same in flying.

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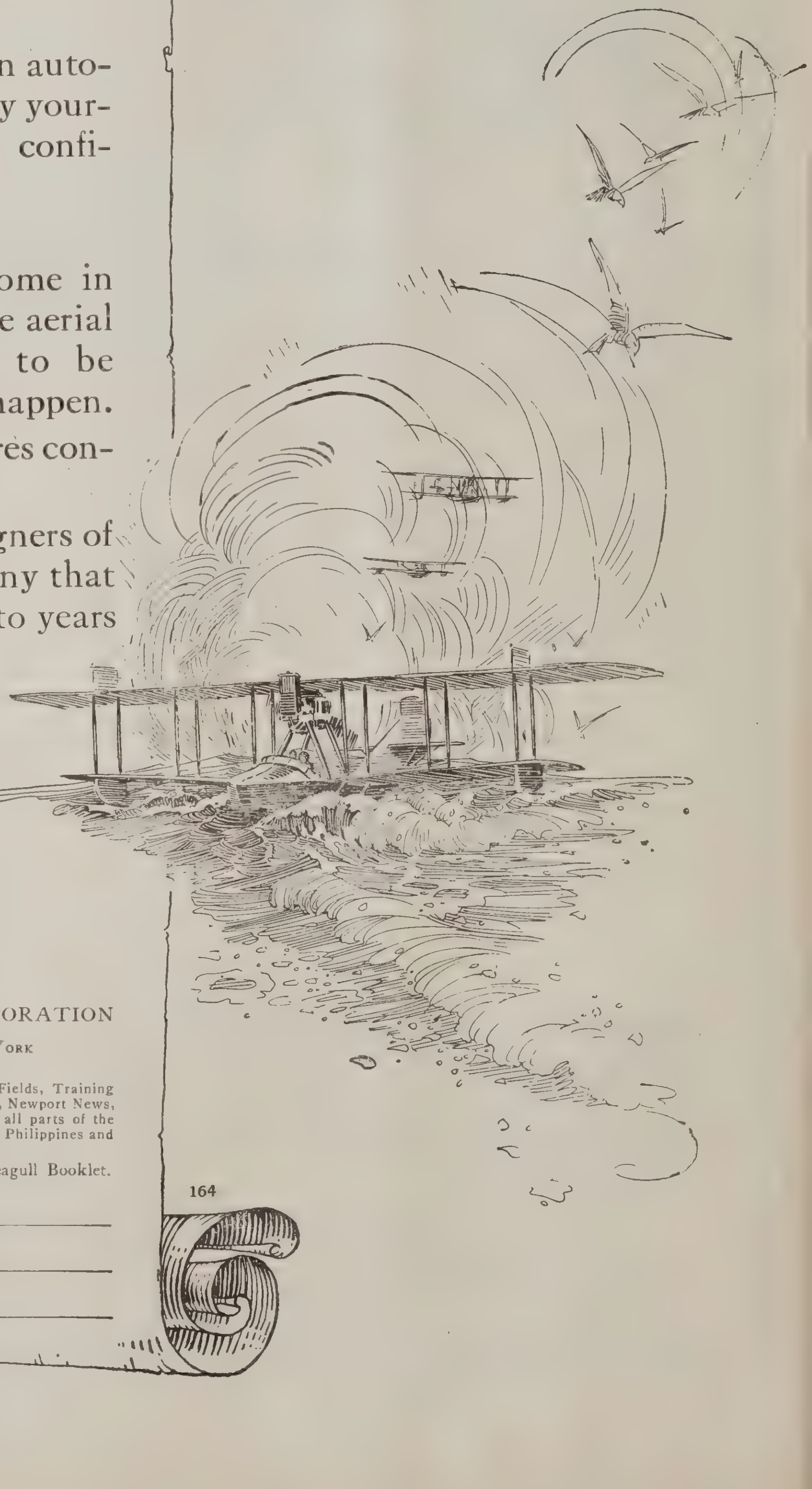
164



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VOL XI. NEW YORK, MARCH 22, 1920 NO. 2

NEW $2,000,000 ORDERS FOR AEROPLANES FOR TRANSPORTATION, SPORT AND PLEASURE

An order for 235 aeroplanes, costing approximately $1,000,000, was placed with the Curtiss Aeroplane and Motor Corporation during the past week by George W. Browne, the Chicago aeroplane dealer.

This order includes one eight-passenger "Eagle," selling at $40,000; a number of three-passenger "Orioles," selling at $9,850 each; a number of "Seagull" flying boats, selling at $12,500. The balance are two-passenger "surplus" Army training planes, which are doing so much to popularize flying.

Other orders placed with various other firms—all regular Aerial Age advertisers, we are glad to state—brought the total orders placed during the past week up to $2,000,000. Among the orders placed, the details of which are not available for publication, are substantial orders received for Avros and Sopwiths by the Interallied Aircraft Corporation of New York; three-passenger Standards by the Nebraska Aircraft Corporation, of Lincoln, Neb.; "Bristol Tourers," by Mr. Rannels, of the Bristol Company, 512 Fifth Avenue, who had a fine individual exhibit at the Imperial Hotel; by Horace Keane, who exhibited the attractive "Ace" at the Vanderbilt Hotel; by W. Wallace Kellett, the Farman representative in New York, who is now ready to deliver two-passenger "Sport-Farmans," as well as fourteen-passenger "Goliaths."

All these firms find the demand for aeroplanes increasing steadily and have arranged or are arranging for faster deliveries, as customers want prompt deliveries. The Bristol and the Ace had only been on exhibition a few hours when they were bought by aviators who saw a chance of getting prompt delivery by purchasing the machine on exhibition.

The many aerial events being organized under the rules and auspices of the Aero Club of America, the Aerial League of America and their affiliated aero clubs and co-operating organizations are directly responsible for the increased demand.

That there is extensive civilian business to be had is admitted even by those employees of the Manufacturers' Aircraft Association and other obstructionists who have been opposing the development of civilian aeronautic activities since the signing of the Armistice, and employed paid "mourners" to circulate reports to the effect that aeronautics would "die" unless the Government subsidized those "poor" manufacturers who had already made millions of dollars in profits during the war.

Obstructionists Argued Themselves Out of Business

As a matter of fact, while they were trying to hold up the Government for subsidies and were creating Congressional antagonism to aircraft appropriations by their "pernicious lobbying," a number of progressive firms like the Curtiss Company, the Martin Company, the Lawson Company, the Inter-allied Aircraft Corporation, the Nebraska Aircraft Corporation and other firms secured substantial business and other firms got a good start. The few retrogressive members of the Manufacturers Aircraft Association who, with the Association's employees, spent their time in scheming, were so busy arguing against civilian aeronautics that they overlooked the fact that they were arguing themselves out of substantial, ready business.

When the announcement was made that the Southwest Airplane Co. had placed orders with the Curtiss Aeroplane & Motor Corporation for 447 aeroplanes, representing a total of $2,500,000, these obstructionists tried hard to cast a doubt on the announcement, and they went to extremes to do so. Now they admit that it was true.

Manufacturers all over the United States have found out that these few individuals who have been using the Manufacturers' Aircraft Association's name in their scheming have hurt American aviation by delaying its development since the signing of the Armistice by their mis-statements, scheming and "pernicious lobbying," which caused Congress to refuse further appropriations; and those responsible have become very unpopular notwithstanding their "subscriptions" and "entertainments," and have brought another Congressional condemnation on the Manufacturers' Aircraft Association and on its half dozen active members by their ill-advised scheming which was referred to in Aerial Age for February 9th and 16th.

Air Service Confirms Orders Amounting to $7,543,000

In a letter dated March 9th the Information Group of the Air Service makes the following comments:

"Recently the Vickers-Vimy Company sold approximately 200 of their commercial type which is similar to the machine in which Sir John Alcock flew across the Atlantic to the Chinese Government. This deal involved several millions of dollars and at the present time Vickers has a corps of engineers and mechanics in China on the ground and has commenced the actual training of the Chinese.

"It was rumored at the Aeronautical show recently held in Chicago that Mr. Martin, manufacturer of the Martin Bomber, was negotiating a contract with the Chinese Government for twenty of his Martin Aerial Transports which are valued at $50,000 apiece. This machine is a revised bomber type, is capable of carrying fourteen passengers, and is equipped with twin American Liberty motors. In the opinion of flyers it is far superior in many respects to anything yet built by any government.

"Now to come back to America. American manufacturers have developed several efficient passenger-carrying machines. Notable among them is the Curtiss Eagle, a multi-motored machine, capable of carrying eight passengers and only dependent on two motors to maintain itself in the air. The Martin Aerial Transport is also another notable achievement and the performance of these planes in the past is well known. The Lawson, twenty-two-passenger air liner, is another well-known machine. When we read in the papers that the Curtiss Company has disposed of 1,038 aeroplanes to their distributors throughout the country, it is indicative that this company believes that large sales will be made by their distributors throughout the year. One airship was also sold at the aeronautical show, the total sales amounting to approximately $7,543,000.

"It is highly gratifying to note that some of the American business men are awakening to the fact that travel by air is not only safe, but it is also on the average fifty per cent faster than with land locomotion. If government support in the development of commercial aviation cannot be obtained, then private enterprise must do so which will retard progress many years. When such private enterprises begin to realize that aeroplanes of the Martin, Curtiss and Lawson types have a cruising radius of from fourteen to twenty hours and can average from 1,400 to 2,000 miles on such a cruising radius, all a sensible and sound mind needs to do is to compare time and mileage against the fast railroad, steamer or automobile and the answer is self apparent."

U. S. Aircraft Demand Will Absorb All Surplus Aeroplanes and Keep Manufacturers Busy

As a whole the "surplus" military training planes have been a great asset to the aeronautic movement during the past year and will continue to be this year. They are admirably suited for the purpose of popularizing aviation. Aviators who began with the purchase of a low-priced "surplus" machine soon made enough money to buy a higher priced machine and many ended by placing orders for the very best high-priced planes available.

The market for "surplus" machines can be stated to be greater than the supply, and the demand for machines in the United States this year will be large enough to absorb all the planes put on the market and to keep manufacturers busy.

Peruvian Ambassador Pezet, Several Years Stockholder in American Aeroplane Company, Tells of Great Future in South America

A number of Latin-American authorities during the past week discussed the future of aeronautics in Latin-American countries.

One of the officials of Latin-American countries who went on record during the past week as believing that there is an extensive market in South America was Señor Don F. Alfonso Pezet, who several years ago became stockholder in an American aeroplane firm, members of which, according to records, have been most antagonistic to civilian developments and foremost in the scheming for Government subsidies which caused Congress to refuse appropriations.

The records also show that they did not believe in the future of the aerial mail and of aeronautics in South and Central America.

Ambassador Pezet's attitude towards aeronautics has not been like the narrow attitude of the officials of the company of which he became a stockholder some years ago. Our files show that in correspondence with editors of Aerial Age, beginning as early as 1912, he expressed his belief in the great future of Pan-American aeronautics and aerial transportation.

In his statements last week Señor Pezet told of the steps which his country was taking to put commercial aeronautics on a firm footing. French, British and American aviators had been engaged by the Government to train native young men, he said. Last year an additional aviation school was authorized and scores of aero clubs organized to foster this new means of travel.

"Commercial and sport flying is commanding considerable attention throughout Peru," Señor Pezet said. "The Postal Department of Peru has asked American and European firms to submit bids for the establishment of more aerial routes for the transportation of mail, passengers and freight. Several air line services are contemplated, for in a country like Peru, where cross-country travel is slow, tedious and dangerous, because of the topography, air transportation becomes the ideal."

The Cuban Government was alive to the commercial possibilities of the aeroplane and was devoting its attention to the establishment of aerial transportation lines to the United States, Señor C. de Quesada, Vice Consul in New York stated.

Señor Francisco Yanes, Assistant Director General of the Pan-American Union, urged American aircraft manufacturers to take advantage of the opportunities offered them for marketing their product. He warned them that European countries were bending all their efforts to get the Latin-American market and had sent special missions to study conditions.

"We need aeroplanes in Latin-America," he said, "to discover our vast unknown interior country, to reach many a new 'El Dorado' lying hidden in some inaccessible region, to find the headwaters of some of our rivers and perhaps to reveal the site of some of our forgotten cities lying asleep in the fastness of some impenetrable forest."

$2,000,000 Seaplane Deal

The Aeromarine Plane & Motor Corporation announce that the Continental Aircraft, Inc., has taken over the entire output of the Aeromarine Plane & Motor Company in the territory from the Alleghanies west to the Pacific.

The deal which is stated to involve the sale of flying boats and seaplanes of at least two million dollars was announced following a meeting attended by Mr. I. M. Uppercu, President of the Aeromarine Company; Harry Newman, President of the Continental Aircraft, Inc.; E. deB. Newman, Secretary of the Aeromarine Plane & Motor Company; P. G. and C. J. Zimmermann and Chas. F. Willard, of the Aeromarine Plane & Motor Company, besides other officials.

The statement reads in part as follows:

"Negotiations have been going on since the Chicago Show. Following the show representatives of the sales organization of the Continental Aircraft, Inc., made a study of flying boats sales possibilities throughout the Mississippi valley and generally throughout the United States. Two men covered the Pacific Coast and reported they had discovered remarkable opportunities for disposing of flying boats in that section.

"Mr. Harry Newman was for many years one of the largest distributors of motor cars in the Central West territory. Realizing the possibilities of the aeronautical field as the result of study before and during the war he decided to become one of the first men in commercial aviation. Last year he sold nearly a million dollars worth of aeroplanes and parts, which was more than was accomplished by any other company or individual.

"The Aeromarine Company has been building aeroplanes since 1908 and during the war turned out 300 flying boats and seaplanes for the Navy at its Keyport factory."

Now the company plans to devote itself strenuously to building seaplanes for commercial use.

AERIAL MAIL WILL GET APPROPRIATIONS IF "PERNICIOUS LOBBYING" IS STOPPED

The Congressional antagonism aroused against aeronautics by the lobbying and other unethical activities of those obstructing employees and members of the Manufacturers Aircraft Association, referred to in the February 9th and 16th issues of Aerial Age, hit the Aerial Mail appropriations even harder than the Army and Navy appropriations, as the Post Office does not have on hand, as the Army and Navy have, thousands of aeroplanes, motors, accessories, and materials, worth hundreds of millions of dollars which can be turned into aircraft of any type by paying for the labor and miscellaneous expenses.

The Aerial Mail Service needs $3,000,000 for the well planned and carefully considered expansion proposed by the Post Office Department. While it is evident that the lobbyists have been making strenuous efforts to influence the Post Office Department in regard to Aerial Mail contracts and have talked loosely of Aerial Mail contracts as subsidies for firms whose war record shows that they made large profits and their after war record shows that they have been unwilling to spend some of their war profits in developing civilian aeronautics, no one can look over the record of the Aerial Mail without a feeling of admiration for the stupendous work accomplished.

The Aerial Mail Service is to be congratulated for its accomplishments—its performances as well as economic management.

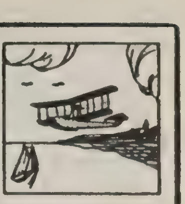
During the fiscal year ended June 30, 1919, the air mail covered 160,066 miles, carrying 230,251 pounds of letters, at a cost of $166,402.52. The revenue from the sale of aeroplane postage stamps was $194,631.50. The foregoing cost of operations included 33 1/3 per cent depreciation, 20 per cent for replacement of parts, and 6 per cent interest on investment. Out of a possible 1,435 trips, only 48 were not attempted. The service scored a performance of 96.54 per cent during the fiscal year.

Since July 1, 1919, the Mail Air Service attempted, up to December 1, 860 trips out of a possible 886. It carried 518,502 pounds of mail. Its record of performance has been 94.88 per cent.

Out of the appropriation for the current fiscal year of $850,500, the department has expended to December 1, in-

(*Continued on page* 63)

THE NEWS OF THE WEEK



Railway Express to Start Aerial Service

The American Railway Express Company will inaugurate an aerial express service between New York City and Chicago as soon as an operating corporation can be formed, according to R. E. M. Cowie, vice-president of the company.

In the opinion of Mr. Cowie, there is an unmistakable place for the aeroplane in connection with express service, the very essence of which is speed.

Today the express service extends over every railroad in the United States, transacting a business of more than $300,000,000 a year.

This immense traffic is made up of approximately 1,000,000 shipments a day. Many of these packages are of extreme urgency in their nature, and it is the respectively lightweight, non-bulky packages of an unusually urgent character that will naturally seek the expedited service that is now made possible by the aeroplane. It would be strange if out of more than a million packages a day a small percentage of them were not of sufficient urgency to justify the cost that would be necessary to transport them by the quickest means of transportation that may be available, and an almost infinitesimal proportion of the volume of express traffic moving would form a substantial cargo for aeroplane transport.

Ellington Field Aviators to Hold Reunion

The officers and flying cadets formerly stationed at Ellington Field, Texas, during the war, will hold a dinner and reunion at the Hotel Commodore, New York City, on Saturday, March 27. A large number is expected to be present.

Col. G. C. Brandt, Department Air Service officer, is to be the principal speaker. Those interested in attending the dinner should address inquiries to the chairman of the committee, Lieut. B. M. Jones, care of Jenks, Gwynne & Co., 15 Broad Street, New York City.

Bristol Exhibit Plane Sold

The British Bristol touring biplane exhibited last week at the Hotel Imperial was sold to Joseph F. Thorne, an American mining engineer, who has a silver mine in Nicaragua. Lieutenant Leslie Simmons, of California, was engaged to act as pilot of the machine. The aeroplane will be used to convey bullion from the mines to the seaboard in Nicaragua. The Bristol is equipped with a 250-horsepower Rolls-Royce Falcon engine, and has a speed of 120 miles an hour.

During the week great interest was aroused in the exhibit, the evening attendance of wealthy sportsmen and sportswomen being particularly large.

Goodyear Co. Buys Naval Air Station at Akron

The United States naval air station at Akron, Ohio, has been purchased from the government by the Goodyear Tire and Rubber Company for expansion of its facilities in the manufacture of dirigibles for commercial use.

The field covers 780 acres, has barracks for 1,000 men and a dirigible hangar that will accommodate four 163-foot ten-passenger airships of the type used by the navy. The equipment includes a complete hydrogen plant capable of manufacturing 100,000 cubic feet of gas a day for the inflation of airships. It is understood the Goodyear Company will concentrate all its aeronautic activities at the field, and immediately start a school for the training of pilots to be used in commercial dirigibles.

Major Maurice Connolly, recently appointed General Sales Manager of the Curtiss Aeroplane and Motor Corporation

Ford Offers to Build Dirigible on Approval

According to a despatch to the New York *Tribune*, Henry Ford, in order to start the rigid dirigible industry and transportation in the United States, has offered to erect a plant at Detroit and build one airship for the government on order, payment for the airship not to be made until trial and acceptance. It is stated that Mr. Ford asked no assurances of future orders, and made no provision for any form of amortization of the initial cost of the plant in the price of the first dirigible. He is willing to take the chances on future government orders and commercial orders, once it is demonstrated that ships of the Zeppelin type can be successfully built in the United States.

The offer virtually was made last summer, but in December W. B. Mayo, chief engineer of the Ford company, came to Washington and laid his plans and project before the general board of the navy, and since then Secretary Daniels and Mr. Ford have personally discussed them. No mention of the matter has been made so far in the exhaustive hearings on naval appropriations before the House Naval Affairs Committee.

It is reported that the Ford company planned to buy, dissemble and bring to Detroit as a pattern one of the latest type recently completed German dirigibles at a cost of something under $1,000,000, and had made all the necessary arrangements, financial and otherwise, to do so, having a representative on the ground in Germany. The plant in which to build the dirigibles would cost $1,000,000.

Aero Club of Vermont Holds Joint Meeting

A joint meeting of the Aero Club of Vermont with the Vermont Society of En-

Dagmar Godowsky and Jascka Heifitz, with Pilot E. H. Rogers, starting on a flight over the Syd Chaplin field in a Curtiss Oriole gineers was held on March 10 at the Hotel Vermont, Burlington.

The joint session was opened in the afternoon by an address on "Aviation Landing Fields," which subject proved of intense and practical interest to those present, and urged that in the development of aviation, the year of 1920 be known as "Landing Field Year."

Col. G. C. Brant, of the Army Air Service, addressed the two organizations at the evening session, and spoke on the subject, "Engineering From the Air."

An aerial program for Vermont was outlined at the meeting which was well attended by members of the Aero Club of Vermont, citizens interested in aviation and many veterans of the Air Service during the war.

Plan Aeroplane Landings On Roof

Plans for converting the roof of the proposed new Union Station in Chicago into a landing ground for aeroplanes have been completed by William J. H. Strong, of the American Association of Engineers. The station roof will have an area of more than two city blocks, affording adequate room for low-speed aeroplanes to land. It would be particularly valuable for the use of mail planes, and the high speed planes could transfer their cargoes to the slower planes in mid-air outside the city limits.

To Map Out Aerial Routes

Demands for accurate information concerning flying routes from New York to nearby cities and resorts will be met by the data obtained by a series of pathfinding flights arranged by the Interallied Aircraft Corporation. As soon as the weather permits, every city and resort within 300 miles of New York will be visited by Avro aeroplanes which will start from Roosevelt Field, L. I. The first flight will be to Atlantic City, the second to Philadelphia, the third to Hartford, Conn., and then others in rapid succession.

With each Avro will go a photographer and he will take pictures of all prominent landmarks and cities en route, landing fields and places where a machine may descend safely.

The machines to be used in these pathfinding flights are the Avro type with 110 horse power Le Rhone rotary air-cooled motors. They will carry three persons and will make an average of about ninety miles an hour when in full flight and will land at thirty-seven miles an hour.

Navy Torpedoplane Under Test

Test flights conducted at Philadelphia with the R-6 Navy torpedoplane have proved successful. Lieut. E. W. Rounds piloted the machine, adjusting its balance in the air and trying out the strength of the pontoon system by making landings with the torpedo in position. The increased length of the pontoon, it is stated, indicated that satisfactory stability on the water had been obtained. Lieutenant Rounds and Lieut. W. G. Brown recently completed experiments at Hampton Roads in which recording instruments were carried to determine the rate of extension of longitudinal oscillation. Two F-5 boats were tried with fixed controls. About ten oscillations were distinguishable resulting from an initial disturbance.

Lecture at N. Y. City College

The practical and theoretical courses in aeronautics which are being held at the College of the City of New York with much success are to be increased this autumn by the addition of a special course on "Lighter-than-Air" machines.

Mr. Harry J. Marx, of the aeronautic faculty, will handle the class. He is to deliver an illustrated lecture on the evening of March 24, 1920, before the City College Aeronautical Society on the subject of balloons and dirigibles covering the theoretical and practical uses. The lectures at the college are open to the public and an open discussion is held afterward.

It was announced at the Aero Show that the value of the equipment has increased to $500,000. The French government has presented the college with one Fokker aeroplane, one Peugeot and one Mercedes motor.

Major Connolly New Curtiss Sales Manager

Maurice Connolly, of Dubuque, Iowa, has been appointed general sales manager of the Curtiss Aeroplane and Motor Corporation, succeeding J. P. Davies, who resigned recently to enter the aeroplane distributing field.

With a wide experience in business, supplemented by a knowledge of aviation gained by more than two years in the Air Service, Mr. Connolly is well qualified to take up the problems of this newst addition to American business.

Mr. Connolly—he was Major until a short time ago when he was mustered out of the service—before the outbreak of the war served one term in Congress as representative from the Third Iowa District and he and F. H. LaGuardia, now president of the New York Board of Aldermen, share the distinction of being the only two men in the United States with the dual honor of having served in Congress and received their flying wings.

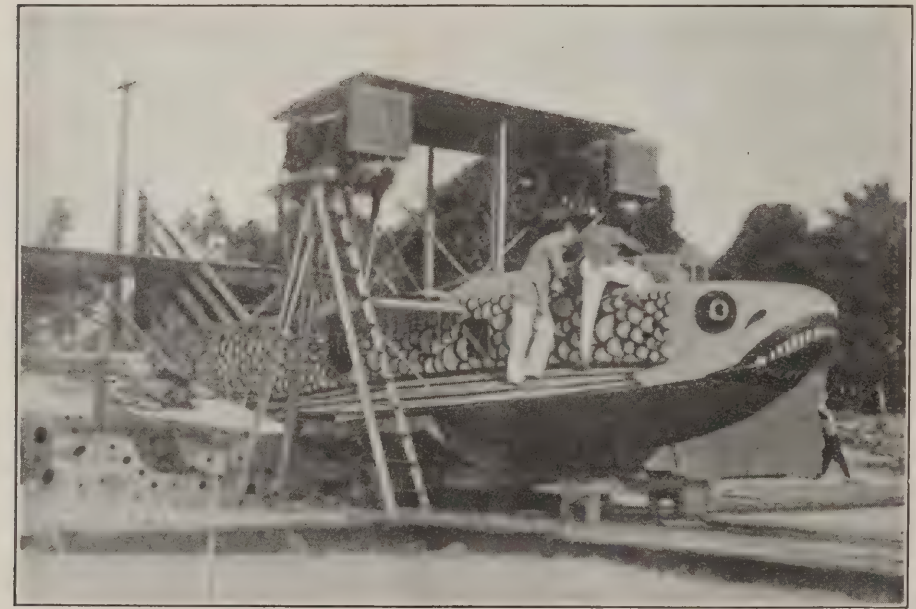
Major Connolly's connection with the U. S. Air Service dates back to the day when war was declared. Giving up his business, he applied for admission into the Service and passed his examinations, being commissioned a captain. He was stationed at Chanute Field, Rantoul, Ill., serving as the first adjutant of that post. Here he took his preliminary flying training, but before he completed his tests he was transferred to other flying centers as executive officer, and at times in acting command.

He completed his flying tests and received his R. M. A. at Wilbur Wright Field, Dayton, O., where he served as executive officer and president of various boards. Upon the signing of the armistice Major Connolly served for a time with Major General William L. Kenly, head of the Air Service, and was then transferred to Hazelhurst Field, where he served under Col. Archie Miller, commander of all aviation activities on Long Island, until he resigned from the service. He flew in the last Liberty Loan Campaign as participant in the Eastern Circus, which covered most of the States east of the Mississippi River, and has recently been commissioned as a lieutenant colonel in the Aviation Reserve with flying status.

Major Connolly is a native of Iowa. He received his A. B. degree at Cornell University and attended the New York Law School, where he received an LL.B. He was admitted to the Iowa State Bar at the age of twenty-one. He then went to Germany, taking up post-graduate work at Heidelberg, later going to the famous Balliol College, Oxford, England.

At the death of his father he took up the reins of business in the capacity of president of the Connolly Carriage Company, of Dubuque, Ia., and at one time was president of the Carriage Builders' National Association.

He is vice-president of the Dubuque Fire and Marine Insurance Company, one of the largest companies in the Middle West, and a director in several financial institutions in Iowa. He served for some years as a regent of the Smithsonian Institution, Washington. He has the distinction of being the only Democrat ever elected to Congress from his district. He served as chairman of the Democratic Party Convention in Iowa and was delegate-at-large to the national convention. He was the democratic nominee for the United States Senate, defeating the present Secretary of Agriculture, Edwin T. Meredith, for the nomination. He ran against Senator Albert B. Cummings, the present Republican incumbent.



Twin-engined Curtiss flying boat, the property of the America Trans-Oceanic Co., at Miami, Florida

The AIRCRAFT TRADE REVIEW
N. E. J.

National Airway Service Co. Organized

Akron, Ohio.—Announcement has been made of the incorporation at Columbus of the National Airway Service Company, of Akron, capitalized at $30,000. Five ex-army pilots, all of whom had active service and training with the American and Allied flying forces, are the incorporators. The organizers are L. E. Ross and E. W. Lofquist, of the Royal Flying Corps; J. W. Kunneke and J. G. Layton, of the American Flying Forces. Commercial aviation will be established in every phase, including passenger carrying, aerial photography and school of instruction in flying and exhibition. An aerodrome will be maintained as the base of operations of the pilots and use of visiting machines. The corporation has purchased a two-passenger and a three-passenger plane and will make a standard charge for trips in the air.

Lawson Airline to Operate in July

July 1 was anounced by Alfred W. Lawson, president of the Lawson Airplane Company as the date for starting the operation of a New York-San Francisco passenger aeroplane line.

The first aeroplane is scheduled to leave this city at 1 A. M., Mr. Lawson said, with accommodations, including sleeping berths, for twenty-six passengers. The schedule calls for a thirty-six-hour trip with stops at Syracuse, Buffalo, Cleveland, Toledo, Chicago, Des Moines, Omaha, Cheyenne, Salt Lake City and Reno.

Mr. Lawson said that ten representatives of the company were making arrangements for the landing fields and sites at 100-mile intervals for light-houses to project shafts of light skyward.

Plan Large Aeroplane Motor Factory

Pittsburgh Aeroplane & Motor Co., Kohler Building, Pittsburgh, has plans under way for an aeroplane motors and parts manufacturing plant at Meadville, Pa., to cost over $1,000,000. Charles L. Sanford is president.

New Flying School to Open in Vermont

A new flying school is to be opened about May 1, at Springfield, Vt., by Messrs. Osgood and Stickney, the Curtiss aeroplane dealers in Vermont and New Hampshire.

They intend to make a tour of the two States during the summer, demonstrating the planes for passenger-carrying, aerial advertising and exhibition work.

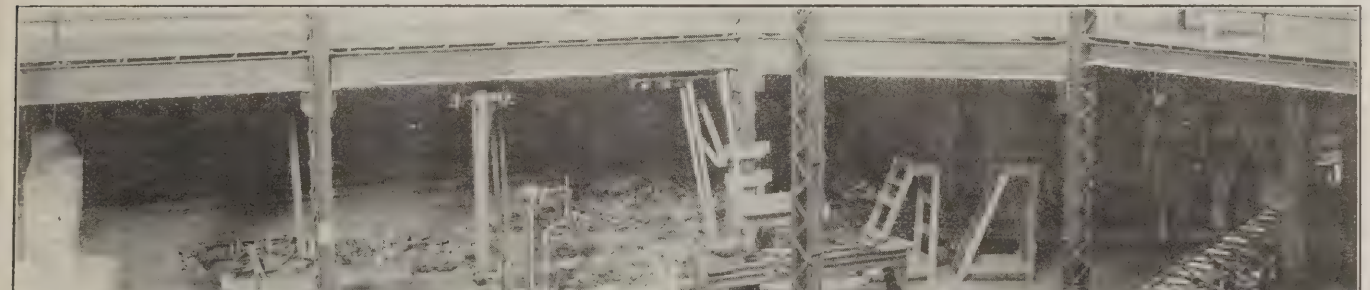
The company is conducting a campaign through the two States to get each large town to establish a landing-field with a hangar.

Aviators Bomb Ice Gorge

Port Deposit, Md.—High explosive bombs were used recently to rescue this town from the menace of the ice in the Susquehanna River. Aviators from the Aberdeen proving grounds flew over the river in a bombing machine and dropped bombs on the gorge of ice which piled up and flooded the town.

Personal Par

Charles M. Manly, a pioneer aeronautic engineer, together with C. B. Veal, have established offices at 250 West Fifty-fourth Street, New York City, as industrial engineers specializing in the coordination of engineering and manufacturing requirements in the design, production and operation of automotive power plants and vehicles.



A line up of Hispano-Suiza motors in the new factory of the Nebraska Aircraft Corporation at Lincoln, Nebraska

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, Assistant to the Second Assistant Postmaster General in Charge of Aeronautics
Louis T. Busslor, Chief of Maintenance and Equipment

J. Clark Edgerton, Chief of Flying
John A. Jordan, Chief of Construction
George L. Conner, Chief Clerk, Aerial Mail Service
John A. Willoughby, Operator in Charge Radio Experiments
Eugene Sibley, Operator in Charge Radio Maintenance and Operation

US
AERIAL MAIL

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Merrill K. Riddick
Robert H. Ellis
Randolph G. Page
Paul S. Oakes
Herbert M. Crader

Charles I. Stanton, Superintendent New York-Washington Division
George O. Noville, Superintendent New York-Cleveland Division
Edward McGrath, Superintendent Cleveland-Chicago Division
William J. McCandless, Superintendent Chicago-Omaha Division
Harry L. Hartung, Manager, Heller Field, Newark
Herbert Blakeslee, Manager, Bustleton
Eugene W. Majors, Manager, College Park
Andrew R. Dunphy, Manager, Chicago
Maurice J. Kelly, Manager, Bellefonte
Victor W. Fitch, Manager, Newark Warehouse

PILOTS

Samuel C. Eaton
Frederick A. Robinson
Elmer G. Leonhardt
Walter J. Smith
Paul W. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris
Clayton W. Stoner
Mark C. Hogue

Squadron Mail Delivered By Aeroplane

Due to the poor train service between McAllen and Laredo, Texas, it takes a week or ten days for correspondence to be forwarded and returned from one station to the other. In cases when matters requiring immediate action arose the round trip has been made by plane in three hours. Should a mail service be inaugurated along the border a great deal of the time wasted by train service could be avoided without inconveniencing the operations of any of the flights. A schedule could be made so as to determine the exact time that the aeroplane carrying the mail would start and the patrols between the two flights could be made at the same time for that day. Weather conditions are the only questionable features to be taken into consideration and there are but very few days in the year that the service could not operate on schedule; but even a delay of twenty-four hours would greatly improve the train service.

Three Aerial Mail Services During French Strike

Paris.—Aeroplanes carrying mails and passengers leave Paris at 10 o'clock for Tours, Bordeaux and Dijon, for Lyons and Marseilles, and for Nancy, Strasbourg and Brussels.

The planes used are of the Goliath type. They are capable of carrying twelve passengers, in addition to the mails. These services will be continued during the railroad strike

Italian Aerial Mail Service During Strike

During the railway strike an aerial mail service was established between Rome and Naples, Florence, Pisa, Turin and Milan. It is to be continued now that the strike is over.

Seaplane Transportation Record

Miami, Fla.—Carrying fourteen passengers in adition to the pilot and mechanician from Bimini, in the Bahama Islands, to Miami, an H-16 is believed to have established a new record for seaplane transportation. Rodman Wanamaker was in the party.

UNITED STATES POST OFFICE DEPARTMENT

AIR MAIL SERVICE—NEW YORK-WASHINGTON ROUTE

Monthly Report of Operation and Maintenance

JANUARY, 1920

Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	SERVICE AND UNIT COST: Gallon of Gasoline	Total Time Run (hr. min.)	Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
7	$7.84	$1.10	$71.19	$76.92	$29.78	$156.67	$4.93	$73.00	$2.00	$67.50	$61.44	$552.37	28	.. 25	25	.9	....	$22.09
30	194.36	27.75	71.19	76.92	29.78	156.67	190.50	282.40	590.23	72.50	61.44	1,753.74	722	16 06	1,327	1.8	$108.90	1.32
31	159.40	43.85	71.19	76.92	29.78	156.67	223.03	290.77	180.15	72.50	61.44	1,365.70	605	18 51	1,615	2.7	72.48	.85
33	....	....	71.19	76.92	29.78	156.68	....	106.26	....	72.50	61.44	574.77	......	....	......	......	....	......
34	165.20	35.52	71.19	76.92	29.78	156.68	187.14	202.52	50.85	72.50	61.44	1,109.74	590	15 49	1,475	2.5	70.14	.75
35	63.00	5.25	71.19	76.92	29.78	156.68	15.37	117.32	1,004.43*	72.50	61.45	1,673.89	210	1 23	100	.5	1,210.02	16.74
36	48.00	12.90	71.19	76.92	29.78	156.68	117.53	213.50	69.45	72.50	61.45	929.90	170	9 56	637	3.7	93.60	1.46
43	212.28	33.56	71.19	76.92	29.78	156.68	313.57	286.38	134.73	72.50	61.45	1,449.04	756	26 26	1,990	2.6	54.84	.73
46	....	....	71.19	76.92	29.79	156.68	....	141.20	1,341.50*	72.50	61.45	1,951.23	......	....	......	......	....	......
47	....	....	71.19	76.92	29.79	156.68	....	80.26	210.81	72.50	61.45	759.60	......	....	......	......	....	......
48	16.80	6.72	71.19	76.92	29.79	156.68	45.36	146.44	33.85	72.50	61.45	717.70	60	3 50	275	4.6	187.20	2.61
49	51.24	7.92	71.19	76.92	29.79	156.68	42.99	206.52	28.09	21.62	61.45	754.41	183	3 38	255	1.4	207.66	2.96
50	181.68	25.81	71.19	76.92	29.79	156.68	75.92	352.37	331.00	72.50	61.45	1,435.31	631	6 25	438	.7	223.68	3.28
44301	7.28	2.04	71.19	76.92	29.79	156.68	11.83	53.27	3.60	35.00	61.45	509.05	26	1 00	80	3.1	509.05	6.36
Total	$1,107.08	$202.42	$996.66	$1,076.88	$416.98	$2,193.49†	$1,228.17	$2,552.21	$3,980.69	$921.62	$860.25	$15,536.45	3,981	103 49	8,217	2.1	$149.64	$1.89

Cost per mile, oevrhead, $0.52; cost per mile, flying, $0.31; cost per mile, maintenance, $1.06.
Note. Plane No. 7, Standard, equipped with Hispano Suiza 8 motor.
Planes Nos. 30 to 50, inclusive, Curtiss R4, equipped w th Liberty 12 motors.
Plane No. 44301, Curtiss JN4D, equipped with Curtiss OX5 motor.

* Includes cost of new wings.
† Includes part of cost of moving station from Belmont, N. Y., to Newark, N. J.

OTTO PRAEGER, Second Assistant Postmaster General

THE AEROPLANE DISPLACES THE AUTOMOBILE IN THE MOTION PICTURE

By JEROME LACHENBRUCH

THE more aggressive industrial concerns of to-day are beginning to appreciate the aeroplane's possibilities. The aeroplane has partly replaced the fast mail trains between our larger cities. It has been used in racing, as a pleasure vehicle, and now it is entering the field of commerce.

Its own peculiar advantages of saving time and of being able to travel where the motor car cannot force its way, has been taken advantage of in a commercial way by the motion picture industry.

The aeroplane has been used as a romantic or spectacular feature on the screen, but never before as a commercial aid. In the past the automobile has been used exclusively for all scouting purposes. For those to whom this term may seem peculiar, let it be explained that one of the needs of the motion picture is to know where suitable outdoor scenes may be taken long before the studio staff is ready to photograph them. As the number of photoplays now produced seems to follow an arithmetical progression, it is clear that the demand for new outdoor backgrounds is imperative. Moreover, for the modern society type of story in which manor houses, beautiful private parks and other settings out of the ordinary are used, the staffs of the various film companies have always been worried over the possibility of not being able to secure the necessary scenes. As a consequence, the automobile scout has had a definite place on the payroll of the motion picture producer.

His job is similar to that of the advance agent of a road show, one of whose duties is to find suitable billboard locations in every town he visits for the display of posters for the coming play. The motion picture "location" scout, in common with the theatrical advance man, always travels "ahead of the show," and keeps in touch with the producing company at the studios by means of the telegraph. It is his duty to arrange for the temporary lease of private properties, to obtain permits to take pictures on government land and to perform a number of simlar scouting tasks.

But with the growth of the motion picture industry, this means of obtaining outdoor locations has proved inadequate to one of our largest photoplay producers. The Goldwyn Pictures Corporation has finally replaced its automobile scout with an aerial one. And the aerial chauffeur is a former lieutenant in the army. In fact, this company has two pilots, Lieut. G. B. Manly and William Wellman, both of whom served in the flying corps of the A.E.F.

One of the "Scout" machines flying over the Goldwyn studios at Culver City, Cal.

Their work in connection with the "location" department of the Goldwyn company consists in flying and photographing scenes available for particular stories. In a single photoplay as many as twenty distinctly different outdoor scenes are sometimes necessary. And to locate these scenes, with production going ahead at the rate of one picture a week, means that speed in finding "locations" is absolutely essential.

This motion picture concern has learned that the aeroplane has one great advantage over the automobile. This is its facility in taking bird's-eye views of scenes; and by means of photographs, permitting the scout to consult with the directorial staff on the advisability of using them. The result of using the aeroplane with Culver City as a center has solved the time problem in securing suitable locations.

A particular, and in some measure, spectacular achievement was the securing of a "location" on Mt. Lick for a picture in which Pauline Frederick is playing the leading rôle. Lieut. Manly flew to the mountain, which is only a short distance from Los Angeles, but which necessitates a long and roundabout trip by motor car, and secured permission to take some scenes two weeks later.

When the time came to take these mountain scenes, in which only three actors participated, they were transported to the mountain by aeroplane. As the Goldwyn

(*Continued on page 57*)

An aerial view of the Goldwyn studios. In the foreground is the street erected for the Geraldine Farrar picture "The World and Its Women"

VARIATION OF HORSEPOWER WITH ALTITUDE AND COMPRESSION RATIO

By H. C. DICKINSON, W. S. JAMES and G. V. ANDERSON

(Report No. 45 of the National Advisory Committee for Aeronautics)

AMONG many other factors which affect the horsepower of an aeroplane engine are the atmospheric pressure, and consequently the altitude at which the engine is working, and the compression ratio, or cylinder volume divided by clearance volume.

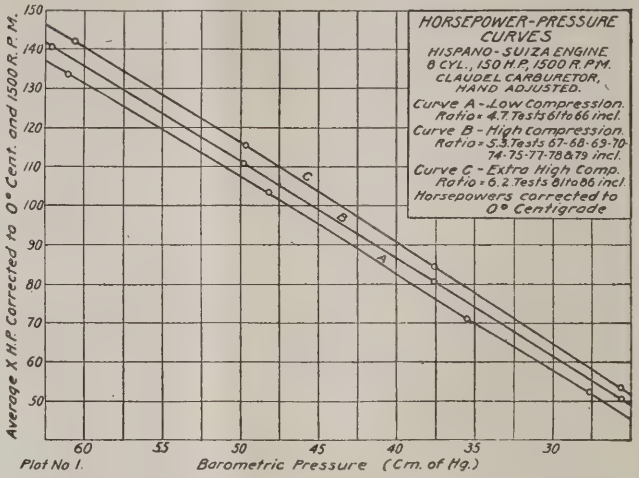
The tests upon which this report is based were selected from a large number of runs made during the intercomparison of various gasolines to determine the variation of horsepower with altitude at three different compression ratios and the following conclusions have been reached:

(1) The total power of the engine decreases rapidly with increase in altitude, being only 71 per cent of the power on the ground at 10,000 feet, 49 per cent at 20,000 feet, and 32.5 per cent at 30,000 feet.

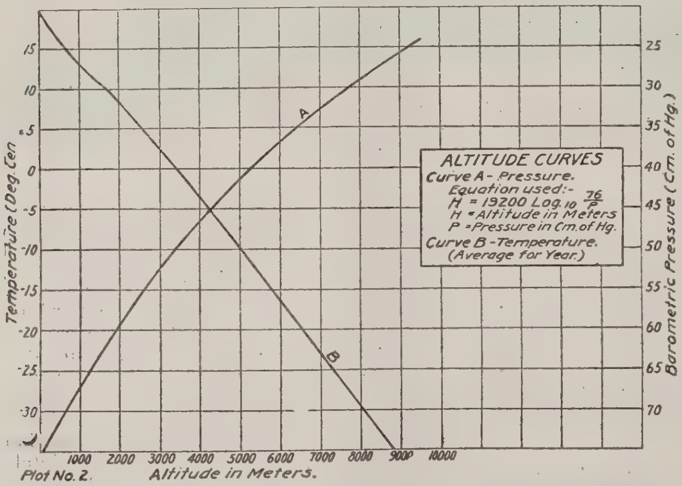
(2) The gain in power due to increase in compression does not bear a constant relation to the total power of the engine at different altitudes, being greater at high than at low altitudes. The curves on plot 8 illustrate this variation in horsepower for the three compressions considered at different altitudes.

Variation of Horsepower With Altitude and Compression Ratio

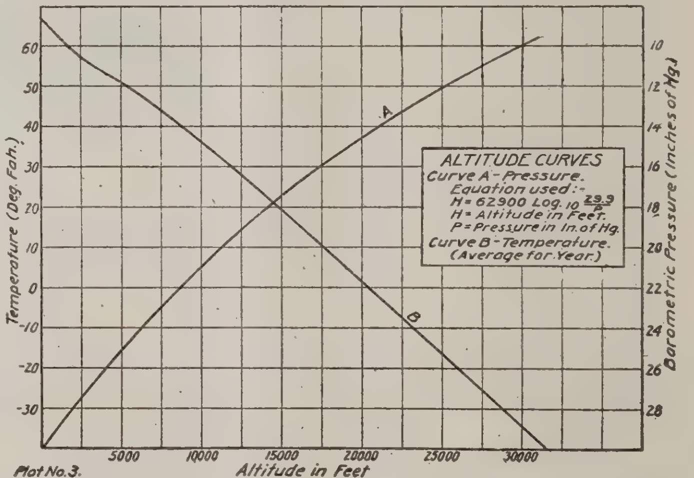
The following report is based upon the results of a series of tests conducted at the altitude laboratory at the Bureau of Standards for the National Advisory Committee for Aeronautics. In this laboratory the engine under test is installed in a concrete chamber from which the air may be partially exhausted by means of a blower, thus reducing the barometric pressure within the chamber to a point corresponding to the pressure at any desired altitude. At the same time, by passing the air, as it enters the chamber, over a series of refrigerating coils and heating grids, the temperature may be regulated during the tests. The power of the engine is absorbed by an electric dynamometer placed outside the chamber



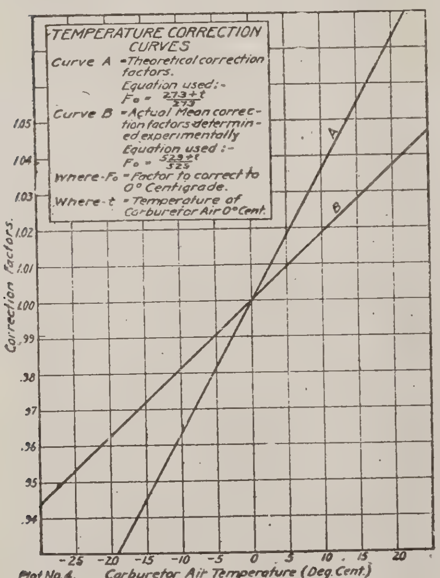
Plot No 1.



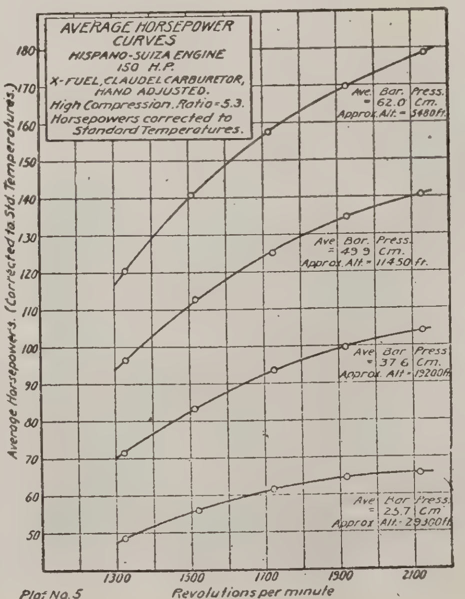
Plot No. 2.



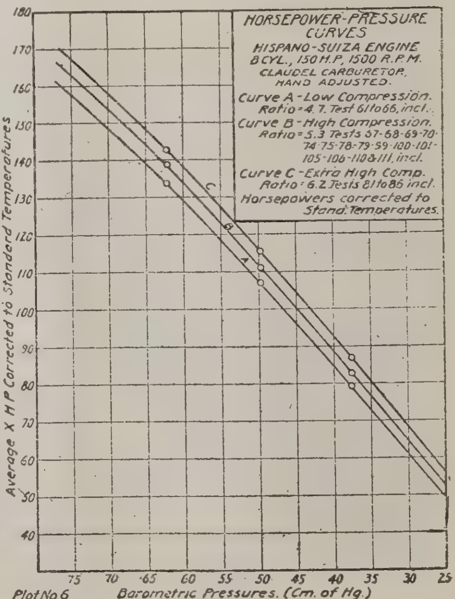
Plot No. 3.



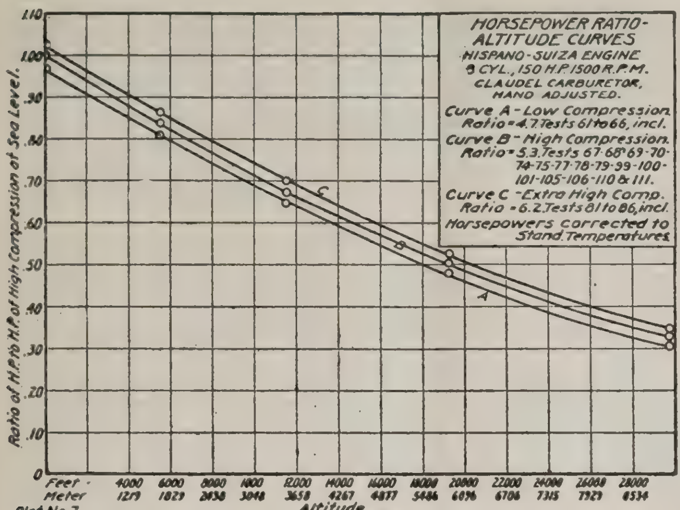
Plot No. 4.



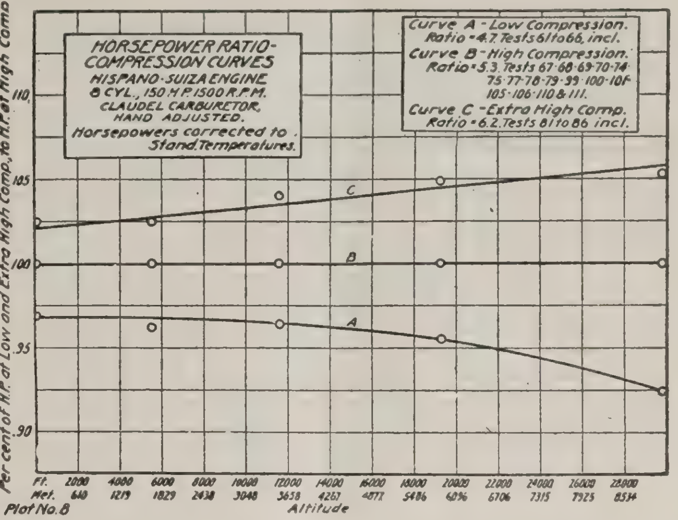
Plot No. 5



Plot No 6



Plot No. 7.



Plot No. 8

and connected to the engine through a flexible coupling. Measurements of power are made by weighing the torque on the dynamometer field at measured engine speeds. A complete description of this apparatus and methods of observation is contained in Report No. 44.

A stock Hispano-Suiza, 8-cylinder engine, rated at 150 horsepower, and built by the Wright-Martin Aircraft Corporation, New Brunswick, N. J., was used in making these experiments. This engine is furnished with three sets of pistons, designated as "low," "high," and "extra high" compression, the ratios of compression, that is $\frac{\text{cylinder volume}}{\text{clearance volume}}$, being approximately 4.7, 5.3, and 6.2, respectively. All of the tests were run on a single grade of gasoline designated as "X," with a Claudel carburetor which was adjusted by hand in each case to give the least fuel consumption consistent with maximum power. All the results are based upon an engine speed of 1,500 revolutions per minute. In the earlier tests the horsepowers were corrected to 0° C., while in the later ones they were corrected to standard temperatures for given barometric pressures, as will be described in a subsequent paragraph.

Tables I, II and III give the results of a number of tests, using the three different sets of pistons, the horsepowers deduced from these tests having been corrected to 0° C. The data contained in these tables are plotted on curve sheet 1.

As it is desirable to obtain the relations existing between barometric pressure and horsepower developed under the actual conditions of flight, the observed horsepower must be corrected from the temperature during the test to the mean temperature encountered in actual flight at the given barometric pressure. To obtain this relation between temperature and barometric pressure, use was made of the information contained in Aeronautic Instruments Circular No. 3, issued by the Bureau of Standards, resulting in the temperature-altitude curves marked "B" on plots 2 and 3. The curve on plot 2 is in metric and that on plot 3 in English units.

To correct a given horsepower, HP_o, at a given barometric pressure from 0° to some temperature t at the same barometric pressure we may make use of the following relation:

$$HP_o = HP_t \times F_o \qquad (1)$$

In which HP_o = Horsepower at 0° C., at the given barometric pressure.

In which HP_t = Horsepower at temperature t degrees centigrade at the given barometric pressure.

In which F_o = Correction factor to reduce horsepower from t degrees to 0° C.

Values of F_o for any given temperature t may be obtained from curve B, or its equation, both of which are given on plot 4, which is a mean curve of correction factors obtained from the results of a number of tests performed at the altitude laboratory with two different carburetors and at various altitudes.

We may obtain an expression for HP_t in terms of HP_o by transposing equation (1), as follows:

$$HP_t = \frac{HP}{F_o} \text{ or } HP_t = HP_o \times \frac{1}{F_o} \qquad (2)$$

in which $\frac{1}{F_o}$ is a factor to correct from 0° C., to the given temperature t.

In the tests performed in the altitude laboratory the runs were conducted at four barometric pressures, which were adopted as standards for comparing the results of different tests and also to facilitate computations. In the later tests, series 99 to 111, carried out with the high compression pistons, the horsepowers were corrected to the mean temperatures corresponding to the observed barometric pressures, consequently it was necessary to establish a set of standard temperatures corresponing to the different standard barometric pressures. The mean values of these four "standard" temperatures obtained from curve on plot 2, together with the corresponding approximate altitudes, are as follows:

Values of horsepower for the three compression ratios were obtained from curve on plot 1 at the standard barometric pressures and tabulated in Table IV. These were corrected

TABLE II.—*Average horsepowers and barometic pressures for tests on X fuel.—High compression ratio =5.3; horsepowers corrected to 0° C. and 1,500 R. P. M.*

Test No.	Barometic pressure	Horse-power	Barometic pressure	Horse-power	Barometic pressure	Horse-power	Barometic pressure	Horse-power
67	62.2	144.0	49.9	111.4	37.7	80.5	25.7	50.3
68	62.1	140.4	49.9	111.2	37.7	79.5	25.7	51.0
69	61.9	141.5	49.6	112.8	37.2	80.5	24.9	51.3
70	62.0	142.1	49.8	112.1	37.6	80.5	25.7	51.2
74	62.2	141.1	50.1	110.2	37.8	80.6	25.7	48.8
75	62.3	138.0	48.8	109.1	37.6	80.4	25.7	50.6
77	62.0	135.8	50.1	115.0	37.7	80.7	25.7	52.2
78	61.9	142.0	49.8	106.5	37.6	79.8	25.6	50.3
79	62.0	138.7	49.9	108.5	37.7	81.5	25.8	49.4
Average	62.1	140.4	49.8	110.8	37.6	80.4	25.6	50.6

from 0° C. to the standard temperatures by use of equation (2), giving the values of horsepower corrected to standard temperatures for the three earlier series, as tabulated in the last column of Table IV.

The runs in series 99 to 111 were made at various speeds. Table V gives the observed values of speed and horsepower at the different altitudes for this series. These data are averaged and plotted on sheet 5 and the values of horsepower at 1,500 revolutions per minute taken from the resulting curves are tabulated and averaged in Table VI with series 67 to 79, both series being on the high compression ratio 5.3. The averaged data are plotted on plot 6, together with the corresponding data for the other two compressions (4.7 and 6.2) obtained from the last column of Table IV, giving curves

TABLE III.—*Average horsepowers and barometic pressures for tests on X fuel.—Extra high compression ratio = 6.2; horsepowers corrected to 0° C. and 1,500 R. P. M.*

Test No.	Barometic pressure	Horse-power	Barometic pressure	Horse-power	Barometic pressure	Horse-power	Barometic pressure	Horse-power
81...............	60.6	145.9	49.7	117.6	37.6	85.7	25.7	53.7
82...............	60.6	142.5	49.7	114.4	37.6	85.4	25.7	53.7
83...............	60.6	139.4	49.7	115.9	37.6	85.5	25.7	53.0
84...............	60.6	143.1	50.0	116.7	37.6	85.4	25.7	53.1
85...............	....	....	49.7	112.9	37.6	82.8	25.7	52.5
86...............	60.5	138.9	49.6	113.9	37.5	84.1	25.7	53.9
Average.......	60.6	142.4	49.7	115.2	37.6	84.8	25.7	53.3

TABLE IV.—*Table of data for reducing horsepowers from 0° C. to standard temperatures.*

Barometic pressure in Cms. of Hg.	Average temperature from curve on sheet 2, 0° C.	Correction factor from curve B on sheet 3 = $(Fo)_t$	Factor to correct from 0°C. to standard temperatures $= \frac{1}{(Fo)_t}$	Horsepower from curves on sheet 1 = HPo: Compression	Horsepower from curves on sheet 1 = HPo: Horsepower at 1,500 R.P.M.	Horsepowers corrceted to standard Temperatures and 1,500 R.P.M.
62.1	10.1	1.019	0.981	Ratio—low = 4.7	136.0	133.5
				Ratio—high = 5.3	140.4	137.7
				Ratio—extra high = 6.2	145.3	142.5
49.8	— 0.1.	1.000	1.000	Ratio—low = 4.7	106.9	106.9
				Ratio—high = 5.3	110.8	110.8
				Ratio—extra high = 6.2	115.2	115.2
37.6	—15.1	.972	1.029	Ratio—low = 4.7	76.9	79.1
				Ratio—high = 5.3	80.3	82.6
				Ratio—extra high = 6.2	84.4	86.8
25.6	—36.6	.931	1.074	Ratio—low = 4.7	46.9	50.4
				Ratio—high = 5.3	50.3	54.0
				Ratio—extra high = 6.2	53.5	57.5

TABLE V.—*Observed horsepowers, revolutions per minute, and barometic pressures for X fuel.—Series 99 to 111; horsepowers corrected to standard temperatures*

Approximate altitude=5,500 feet

Test No.	Barometric pressure	Speed	Horsepower	Speed	Horsepower	Speed	Horsepower	Speed	Horsepower	Speed	Horsepower
99.......	62.0	1,310	119.7	1,504	141.9	1,710	158.3	1,923	168.7	2,110	174.2
100.......	61.9	1,325	126.1	1,515	147.1	1,715	162.7	1,925	173.4	2,140	181.0
101.......	62.1	1,300	114.2	1,518	135.0	1,715	154.0	1,920	165.1	2,155	177.1
105.......	62.3	1,375	124.0	1,525	141.7	1,725	148.0	1,965	173.2	2,140	179.3
106.......	62.1	1,365	122.8	1,536	140.4	1,763	153.4	1,925	165.8	2,140	174.2
110.......	61.9	1,305	118.9	1,480	139.9	1,695	159.2	1,890	171.4	2,120	182.0
111.......	61.9	1,315	116.3	1,485	137.2	1,700	157.0	1,910	171.0	2,156	181.1
Average...	62.0	1,328	120.3	1,509	140.5	1,718	157.5	1,924	169.8	2,137	178.4

Approximate altitude=11,500 feet

Test No.	Barometric pressure	Speed	Horsepower	Speed	Horsepower	Speed	Horsepower	Speed	Horsepower	Speed	Horsepower
99.......	49.9	1,310	96.2	1,517	114.0	1,715	127.0	1,907	134.9	2,105	139.5
100.......	49.8	1,315	96.5	1,500	113.0	1,725	126.7	1,930	138.6	2,115	143.0
101.......	49.9	1,315	93.9	1,505	109.9	1,730	118.7	1,925	127.9	2,107	133.2
105.......	50.2	1,340	95.8	1,515	110.8	1,715	124.0	1,910	134.0	2,135	140.5
106.......	49.8	1,370	96.8	1,540	111.2	1,750	120.7	1,945	130.5	2,150	135.0
110.......	49.8	1,327	101.2	1,540	119.8	1,710	130.2	1,915	138.7	2,120	144.8
111.......	49.95	1,305	92.9	1,500	111.0	1,737	126.9	1,927	137.2	2,130	144.5
Average...	49.9	1,326	96.2	1,517	112.8	1,726	124.9	1,923	134.5	2,123	140.1

of horsepower at 1,500 revolutions per minute, corrected to standard temperatures versus barometric pressure for the three compressions.

From these curves the ratios of the different horsepowers for each compression to the horsepower at sea level for the high (5.3) compression were computed. These ratios were plotted on plot 7 against altitudes in feet corresponding to the different barometric pressures. The altitudes were computed from the formula:

$$h = 62{,}900 \log_{10} \frac{76}{P}$$

obtained from the Smithsonian Meteorological Tables for 1907, page 100, in which h is the altitude in feet and p is the atmospheric pressure in centimeters of mercury.

The curves on plot 8 illustrate the variation in horsepower with compression ratio at different altitudes. The horsepower developed with the 5.3 or "high" compression ratio at the different altitudes was taken as 100 per cent and the other two compression ratios were plotted as percentages of this curve. As will be seen upon examination, the gain in horsepower due to "extra-high" over "high" compression amounts to but 2.8 per cent at 5,000 feet, while it increases to nearly 5.8 per cent at 30,000 feet. Likewise the decrease in horsepower due to "low" compression, while only 3.3 per cent at 5,000 feet, amounts to about 7.3 per cent at 30,000 feet.

It is evident, therefore, that the value of high compression is more apparent at high than at low altitudes.

It should be pointed out that any comparison of absolute horsepowers for the different compression ratios may be misleading as the engine conditions, such as fit of piston and rings, condition of valves, etc., were not the same in each case. However, the manner in which the horsepower varies with barometric pressure in each case may be taken as characteristic for the given combination of engine, carburetor, and fuel with a given compression ratio.

In conclusion, it may be stated that practically all the tests conducted in the altitude laboratory show nearly the same relation between horsepower and altitude. Any given set of conditions which affect the operation of the engine may be held approximately constant during one test and the variation of horsepower with altitude determined for these conditions. Only a small amount of this information has been collected in this report, as the tests upon which it is based were chosen particularly to show the power-altitude relation at different compression ratios.

Approximate altitude=19,200 feet

99.......	37.6	1,300	71.2	1,500	84.6	1,715	95.2	1,920	100.6	2,100	103.3
100.......	37.5	1,310	71.7	1,500	83.3	1,720	95.0	1,920	99.5	2,135	107.0
101.......	37.8	1,310	69.4	1,520	81.0	1,725	88.9	1,940	95.6	2,120	98.5
105.......	37.7	1,355	71.4	1,528	82.3	1,725	90.6	1.923	98.4	2,140	105.4
106.......	37.5	1,360	72.8	1,515	82.6	1,745	91.7	1,925	98.6	2,140	102.5
110.......	37.55	1,289	74.0	1,513	88.3	1,718	96.7	1,896	99.4	2,100	105.7
111.......	37.6	1,310	71.1	1,487	82.8	1,717	94.2	1,910	101.9	2,125	105.2
Average...	37.6	1,319	71.7	1,509	83.6	1,724	93.2	1,919	99.1	2,123	103.9

Approximate altitude=29,600 feet

99.......	25.7	1,303	47.7	1,535	56.6	1,730	61.4	1,930	62.6	2,105	65.1
100.......	25.5	1,330	48.4	1,505	55.8	1,725	61.8	1,930	64.4	2,105	64.1
101.......	26.0	1,314	45.1	1,512	52.9	1,707	58.3	1,924	62.4	2,120	63.1
105.......	25.9	1,310	47.3	1,505	55.8	1,705	61.4	1,914	65.9	2,115	68.8
106.......	25.7	1,370	47.6	1,560	54.4	1,735	59.6	1,885	60.8	2,085	60.8
110.......	25.7	1,290	48.2	1,510	57.2	1,723	63.6	1,900	64.8	2,120	63.2
111.......	25.7	1,310	51.2	1,505	59.1	1,710	65.7	1,937	69.9	2,130	72.0
Average...	25.7	1,318	47.9	1,519	56.0	1,719	61.7	1,917	64.4	2,112	65.3

TABLE VI.—*Table of data for averaging horsepowers for high compression from series 67 to 79 and 99 to 111; horsepowers corrected to standard temperatures and 1,500 R. P. M.*

A=averages from Table IV.			B=average from Tables V.			C=averages from A and B		
	Barometric pressure	Horse-power		Barometric pressure	Horse-power		Barometric pressure	Horse-power
Average of 9 tests, series from 67 to 79..	62.1	137.7	Average of 7 tests, series from 99 to 111	62.0	140.0	Average of 16 tests, series from 67 to 79 and 99 to 111......	62.05	138.9
	49.8	110.8		49.9	111.0		49.85	110.9
	37.6	82.6		37.6	82.8		37.60	82.7
	25.6	54.0		25.7	55.3		25.65	54.65

(*Reprinted from Report No. 45 of the National Advisory Committee*).

(*Continued from page* 53)

company has two Curtiss planes, each seating two passengers besides the pilot, the actors and the director were driven to the scene of their day's work on the first flight. The camera man, his assistant and the assistant director made the second trip. Within forty-five minutes the camera was cranking the mountain scenes on their way to find a mortal sort of immortality in celluloid. Another trip by Mr. Wellman brought box lunches and several thermos bottles with hot coffee. Of course, this was the first time that a trip of this kind was ever taken by the actors, and it was exciting play for the participants. Yet it showed the practicability of the aeroplane in a business venture. For, despite the fact that the making of motion pictures has the theatric about it, the ways and means of saving time and money give the process an industrial basis.

Another unusual development of the aeroplane in connection with the motion picture is in the field of the industrial film. The Goldwyn-Bray studios are making a series of interesting studies of America's industries, and have decided to use aeroplane views of large industrial units to accompany their pictorialized stories of the various industries which they present on the screen. By means of these bird's-eye views the physical extent of a plant may be grasped at a glance and the inter-relation of one department with another may be shown by photographs taken from a low flying machine. The accompanying photograph shows the layout of several exterior scenes erected on the grounds of the Goldwyn studios in Culver City, Cal. In the foreground is a huge set, which when finished represented a famous square in Moscow. To the left is a backwoods "hotel," used in a western picture. Far in the distance are the various indoor stages with glass roofs and walls, the administration buildings and the beautifully laid out grounds. The plant covers more than fifty acres.

To what extent this development of the aeroplane in connection with the business side of the motion picture will reach it is too early to prophesy. It is not too far-fetched, however, to say that within a comparatively short time entire companies will be transported over the hills to the scenes of their day's outdoor work; and that passenger aeroplanes will leave Culver City, Cal., with a company of players in the evening to make winter scenes in British Columbia the next morning.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. *It is not surprising, therefore, that the Congressional Committees find it hard to make an adequate report of the situation in less than two hundred printed pages.* Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congresional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and* 16*th and by Mr. Hughes in his* 1918 *investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

This statement, presented under military authority, proudly sets forth the great copper interests of Mr. Potter and Mr. Ryan, of which they were the respective heads. It is no part of this report to recite the enormous increase in profits of these copper interests during the war, as shown by the hearings (pp. 73, 86), nor of their dealings with the Government, as disclosed at pages 63, 64, 73, 74, 75, 84, 85 and 86 of the hearings. These controlling copper interests of which Ryan and Potter were the heads are alleged to have added $50,000,000 more to their coffers since the war, according to statements heretofore presented to the House by another subcommittee of the Select Committee of Fifteen appointed to investigate the expenditures of the War Department. The intimate connection of these powerful interests and of Mr. Potter and Mr. Ryan with Secretary Baker, representing the Government, has never been explained.

Deeds, Potter and Ryan Without Any Knowledge of Aircraft

Deeds had no knowledge of aircraft nor have any known reasons ever been given for his appointment. Equally inscrutable are reasons for appointment by Secretary Baker of either Potter or Ryan to their positions of great aircraft responsibility. Testifying before the Thomas Senate committee, Director Ryan was asked:

> Senator Reed. What was Mr. Potter's occupation or business before he came in?
>
> Mr. Ryan. He was in the mining and metallurgical business and connected with the Guggenheims.
>
> Senator Reed. And never had anything to do with aircraft?
>
> Mr. Ryan. I think not (p. 65).

That briefly presents Potter's aircraft qualifications.

Testifying before the same Thomas Senate committee, Director Ryan was asked regarding Potter, Kellogg, Wolff, Brown, Fletcher, Downey, Lockhart, Mixter, and Leadbetter, all of whom were his assistants in aircraft production:

> Senator Reed. There was not a single one of these men who had had experience so far as you know in aircraft production?
>
> Mr. Ryan. Not so far as I know.
>
> Senator Reed. They were men that you think had the final say in regard to contracts before you took charge?
>
> Mr Ryan. Subject, of course, to Gen. Squier, who was Chief of the Signal Corps. They were under him (p. 70).

These men had charge of aircraft production during the most critical months of the war with Germany. Mr. Ryan was appointed director May 20, 1918. In July he went to Portland, Ore., and other places, as will later appear, returning from his 6,000-mile trip in August, and, after a few days spent in the East, sailed for Europe in August in company with Secretary of War Baker, who had made Mr. Ryan also an Assistant Secretary of War a day or so before they sailed. Both remained away until October 13, or shortly before the end of the war. Apart from the two trips that took him away from aircraft duties in Washington for several months, Mr. Ryan had large private business interests and other duties to care for. His absence was commented upon by Henry Ford, who was complaining about delayed production in aircraft during those critical times of war and gave his reasons to the Thomas committee. Mr. Ford, of Detroit, was probably the largest producer of aircraft engines in the country during the war.

Mr. Ford's Criticisms "Obviously True"—Baker

In July, 1918, he said (p. 38 of the record):

> I do not know how you can have the head of the aircraft division around New York sitting down there and have him do very much. This is the first time I have said anything about Mr. Ryan and I do not know anything about him. I think they ought to be on the job no matter who they may be . . . It is necessary to have somebody who is broad and knows what he is talking about to go around to the different factories and tell them what to do.

To this common-sense view Secretary Baker responded to our committee (p. 38):

> Well, his (Mr. Ford's) observations are not only those of a very great expert, but they are obviously true.

Mr. Ford's testimony before the Senate committee was given several weeks prior to the extended trip to Europe, taken by Assistant Secretary of War and Aircraft Director Ryan with Secretary Baker.

No higher authority in administration circles need be quoted than Mr. Ford, yet so far as appears from testimony before the committee none of the various officials in charge of aircraft production from Director Ryan down had any particular knowledge of the subject, nor did they go around to the different factories and tell them what to do, for obvious reasons.

Responsibility of Army Officials

Responsibility for failure of our aircraft program rested upon those in authority, who have been named, and with equal force responsibility rested on Army officers in this country whose duty it was to provide an efficient aircraft force. Officers of the Army, who for many years have been subject to strict Army discipline, generally are loath to express themselves freely when their associates or superiors are concerned. Testimony from three responsible aviation officials, two of whom were in France charged with work on the front, is self-explanatory. All these officers were old experienced flyers of undoubted ability.

General Foulois, early in 1917, shortly after the declaration of war, testified that he prepared for the General Staff and Congress an aircraft program covering 22,625 planes of specified types; 5,000 pilots, and 50,000 mechanics, at an estimated expense of $640,000,000, which amount Congress immediately appropriated (p. 367).

Gen. Foulois further testified:

> I was the responsible officer (in France) under the commander in chief. . . . Certain members of the General Staff were willing to be educated, but that was a very small minority. Other members were more or less disinterested and a certain proportion opposed to aviation.
>
> Mr. Frear. What was that opposition grounded on?
>
> Gen. Foulois. . . . We could hear constant complaint about these young aviators running wild all the time, and too much rank and a great many features of that kind. . . . In my 21 years of service I have never seen it (jealousy in the Army) more prevalent than it is to-day. . . . Gen. Pershing, in my opinion, is the best friend aviation has in the Army. If it had not been for him, on a great many occasions we would not have had any Air Service.

Gen. Mitchell was commander of Air Service for a long period in France and was in the American Expeditionary Forces from the beginning to the end of the war and an experienced aviator.

Gen. Mitchell, with Ambassador Sharp, sent a cablegram April 16, 1918, to Gen. Squier strenuously urging 20,000 fighting planes for control of the air as described in program submitted (p. 2615). Again in May, 1918, a strong cablegram was sent Gen. Squier (p. 2618). These telegrams were never acknowledged. "They did not know in this country whether we knew anything about it. There were no dealings with the Signal Office. We could get absolutely nothing out of them" (p. 2638).

Gen. Kenly was Chief of Air Service from May, 1918, to practically the end of the war. He testified before the committee to the following effect: That appointments to the Air Service, as well as to the command of the Air Service, were not made because of any experienced of the one appointed, and that such condition exists to-day. It may be due to favoritism or due to relationship, but it affects the morale of the department. Gen. Kenly advised that the Air Service should be put into the hands of a man conversant with the work and thoroughly in earnest about it (p. 3497).

(*To be continued*)

NAVAL and MILITARY AERONAUTICS

Navy Planning Large Triplanes

Bids received from aircraft manufacturers for the construction of one of the giant naval triplane-seaplanes, designed to fly across the Pacific Ocean, were opened at the Navy Department in Washington, March 16.

From naval officers it was learned also that the two seaplanes, while designed primarily to cooperate actively with the Atlantic and Pacific fleets in offensive tactics, were also planned to be used as a rapid means of communicating with the far-flung possessions of the United States in the Pacific Ocean.

With a view of facilitating the flight across the Pacific the naval officers pointed out that Secretary Daniels appeared before the executive session of the House Naval Committee and requested the construction of naval air stations at Honolulu, Guam and Manila. These three places are situated on the tentative route under consideration by the navy.

Several models of the triplanes have been constructed to scale for the purposes of testing in wind tunnels. The armament of the new aerial giants is impressive in its magnitude. Its total weight will be 9,000 pounds, and will consist of cannon, machine guns, and bombs. All these weapons are designed principally for attack rather than defense. The general armament specifications are as follows:

One automatic cannon and mount, 250 pounds; automatic gun ammunition, 70 pounds; eight Lewis machine guns, 160 pounds; eight Lewis gun mounts, 200 pounds; Lewis gun ammunition, 320 pounds; bombs, or torpedoes, 7,200 pounds. The bombs can be varied in number and weight according to the nature of the operations to be engaged in. The suggestion is for bombs ranging in actual weight from 250 to 1,800 pounds each.

The most important requirement in the construction of the triplane, required of the prospective contractor is that it shall have the ability to ride out heavy winds when adrift at sea. The plans call for ability to land and get away in the open sea in winds up to twenty miles an hour without undue punishment of the hulls or the planes.

Air Service Sales

Following is a table prepared by the Statistics Branch of the General Staff of the aeroplane and aero engine sales of the War Department.

Sales are shown for period November 11, 1918, to February 27, 1920.

Sixteen planes and 214 engines transferred to the Navy or Post Office Department and 11 foreign engines sold to schools are not included in the following tabulation.

Aeroplanes—Without engine unless otherwise specified

	Number sold	Approximate cost	Sale price	Sale price in per cent of cost
Serviceable				
L.W.F., with eng.	26	$327,600	$321,000	98.0
SJ-1, with eng ..	255	1,721,250	156,563	9.1
JN-4, A-B-C-D's	1,616	7,676,000	646,400	8.4
SJ-1............	1,100	5,225,000	220,000	4.2
Total...........	2,997	$14,949,850	$1,343,963	9.0

Seven unserviceable planes without engines were sold for $1,650. These planes were, in the main, considered scrap material.

Engines

Serviceable				
Hispano-Suiza I	1	$3,375	$4,000	118.5
Liberty 12A.....	7	29,750	20,500	68.9
Le Rhone 80....	5	15,000	8,136	54.2
Hall-Scott A5A..	2	7,200	2,000	27.8
Thomas 5.......	1	3,600	800	22.2
Hispano-Suiza A	287	990,150	214,182	21.6
OX-5...........	4,608	9,676,800	1,843,200	61.0
Hall-Scott A7A..	4	8,000	800	10.0
Total..........	4,915	$10,733,875	$2,093,618	19.5

Fifty-one unserviceable engines (practically scrap) were sold for $9,851.00.

Plans Glass Cage for High Flight

Dayton, Ohio.—When Major J. H. Schroeder, chief test pilot of McCook Field and holder of the world's altitude record, makes his next trial he will ride in an aeroplane offering added protection. A glass cage is being installed in a La Pere plane to protect him from the air, and his oxygen tank will be installed in it. It will be several weeks before the glass cage is completed for a new flight.

Aerial Distances Computed by Army

THE War Department recently authorized the publication of aerial line distances computed from one hundred mile circles drawn around New York and Miami, Fla. In flying, the conditions and the earth curvature may increase the distance up to twenty per cent.:

Miles from New York

Albany, N. Y.	135
Atlanta, Ga.	650
Bangor, Me.	375
Boston, Mass.	200
Buffalo, N. Y.	300
Butte, Mont.	1,875
Chicago, Ill.	700
Cincinnati, Ohio	550
Cleveland, Ohio	400
Denver, Colo.	1,580
Detroit, Mich	485
Duluth, Minn.	1,000
Fargo, N. Dak	1,300
Halifax, N. S.	600
Hamilton, Bermuda	725
Hartford, Conn	120
Houston, Tex	1,400
Kansas City, Mo	1,100
Key West, Fla.	1,000
Los Angeles, Cal.	2,200
Mexico City, Mex.	1,750
Miami, Fla.	950
Milwaukee, Wis.	750
Minneapolis, Minn.	1,100
Montreal, Canada	300
New Orleans, La.	1,050
Omaha, Neb.	1,100
Philadelphia, Pa.	87
Pittsburgh, Pa.	325
Portland, Me.	275
Portland, Ore.	2,475
Providence, R. I.	180
Quebec	435
St. James Bay	800
St. Johns, N. F.	1,200
St. Louis, Mo.	850
St. Paul, Minn.	1,100
Salt Lake, Utah..	1,875
San Francisco, Cal.	2,450
Savannah, Ga.	650
Seattle, Wash.	2,500
Sydney, N. S.	800
Toronto, Canada	325
Vancouver, B. C.	2,500
Washington, D. C.	220

Three-quarter front view of the Central Aircraft Co.'s 9-seater, described in last week's issue

FOREIGN NEWS

Establish a Commercial Aerial Service Between France and Morocco

A commercial Aerial Transportation Company has been incorporated in France under the name of "Liones Aeriennes Latecoere," and has established a Commercial Air Line running from Toulouse, France, to Rabat, Morocco.

Ordinary and registered mail for western Morocco may be sent in this way. French official mail between France and Morocco goes by this route. The average passenger and freight-carrying capacity of aeroplanes travelling this route is approximately 1,100 pounds. This does not include the pilots and fuel for about 5½ hours' flight.

The company operating this line is subsidized by the French Government by an allotment of 10 million francs to cover a period of 15 years for the purchase of new equipment and additional subsidy of four millions has been granted by the Morocco Government for the same purpose.

The aeroplanes which first started the service were Breguet biplanes with 300 H. P. Renault motors. The company is substituting a new type plane which will carry two passengers equipped with the Salmson 250 H. P. motor.

German Firm Demonstrating Aeroplanes in Sweden

The German aeroplane company Siemens Schuckert has sent one of its expert aviators to Stockholm, Sweden, to demonstrate a new type of Siemens-Halska biplane.

This machine is patterned after the scout type used 'by Germany during the War. It is equipped with a 240 H. P. rotary Siemens-Halska motor. One of the peculiarities reported concerning the performance is that while the motor is running with the greatest number of revolutions the propeller revolutions give double the R.P.M. of the motor. While another point is that the motor loses none of its effectiveness at great heights. This machine is capable of ascending 6,000 meters in 15 minutes.

The machine has received great praise in Stockholm and is said to be especially adapted for couriers, police, customs work and sport.

Surveying Indian Aerial Routes

The officers of the Royal Air Force who have been deputed to undertake the preliminary survey for the chain of air routes that is to connect all the chief commercial and industrial centres of India, have covered much ground in the past three months and have selected several landing stations, in addition to a site near St. Thomas Mount, Madras, which seems especially well adapted to the requirements of the aviator.

New French Air Routes

Paris.—That commercial flying is a success is shown by figures in possession of the French Aviation Ministry. Between the months of May and November of last year three air routes were established and operated apart from irregular flights. These were between Paris and London, Paris and Lille, and Toulouse and Rabat (Morocco). The statistics of the flights made in that period are as follows:

Flights, 1,079; kilometers flown, 442,000 (274,594 miles); passengers carried, 1,356; parcels carried, 4,518.

Encouraged by this success, the Under-Secretary for Aviation is planning a wide network of air routes across France and to the African colonies, as well as to England, Spain and Italy. The comparatively small sum of 135,000,000 francs has been voted by Parliament to develop airdromes and subsidize private companies, but with this it is considered possible to lay air routes which will cover more than 8,000 kilometers.

Six of these routes will be international, leading to London, Spain, Brussels, Germany, Algiers and Tunis. Three will cross France from Bordeaux to Perpignan, from Tours to Savoy, and from Nimes to Nice. From these smaller lines will branch, and the scheme proposes to link up France with Corsica and the Balearic Islands by a service at least twice each week. It is also proposed to establish a service of water planes on the large rivers.

Civil Aerial Navigation in Spain

Civil Aerial Navigation is developing to a great extent in its industrial propaganda, as is shown by the great number of airships which have arrived in Spain; some of them accidentally as a consequence of international flights, and some of them temporarily to show by exhibition flights the security of the mechanism of their machine and the advisability of its acquisition.

His Majesty the King, at the suggestion of the Minister of Finance, has decided upon the following provisions:

That the importation of merchandise in all classes of airships is absolutely prohibited until an agreement has been made between the Spanish Administration and the country requesting it.

All airships coming from abroad, desiring to fly in Spanish space and land in Spanish territory, must make their first landing in an aerodrome fitted with customs service, where customs duties may be appraised and paid, or sufficient security given to cover same if within the period of six months the departure of the airship for abroad has not been arranged.

For the purpose of the previous article, the aerodromes adjoining Barcelona, San Sebastian, Malaga and Sevilla shall be considered as fitted with customs service.

National or foreign companies, who for various purposes may establish a regular aviation service in Spanish territory, must obtain fiscal authority for the aerodromes already established or to be established in future, accompanying their request with a report of the airships to be used in such service.

In case of voluntary or forced landings in private aerodromes which are not fitted with customs service, the person or operating company, shall give immediate advice to the nearest customs authority and must not permit the airship to resume its flight without written authorization of the customs authorities.

Aeroplanes of private ownership, either foreign or national, by construction and by nationalization through payment of customs duties may enter and depart from Spain in flight, by previously guaranteeing the payment of duties in the first case and in the second case being subject to the provisions of the customs laws for the temporary importation and passage over the frontier of vehicles. The provisions and rules which govern the circulation of automobiles crossing the frontier shall be applicable as much as possible.

A Flight from Paris

The new model Handley-Page commercial aeroplane, type W-8, recently flew from Paris to London on the conclusion of the Aviation Exhibition held in the French capital.

The machine thus accomplished a unique performance by flying to and from the exhibition, although it had only carried out one short test flight of 20 minutes before it made its cross-country flight to Paris in 2 hours 10 minutes.

Civilian Aircraft of Italy

The following particulars of the Ricci R-1b tri-motored twin-boat-bodied seaplane with 750 h.p. are now on hand.

The engines, which are Isotta Fraschinis, are placed in two power eggs between the planes driving propellers and the other in a central nacelle actioning a tractor.

The twin boat-bodies contain accommodation for goods and fuel tanks and extend very far forward. At their other extremities they carry the monoplane tail plane with triple rudders and vertical fins, etc.

A coefficient of safety of 6 has been shown by this machine under its wing tests with the cellule inclined 15 per cent from the normal.

The data given by the designers are as follows:

Type	R-1b goods carrier
Total surface	120 sq. m.
Total length	13.50 sq. m.
Total height	4.50 sq. m.
Span	24 m.
Speed	160-170 km.p.h.
Motors	Three Isotta Fraschini 250 h.p.
Weight empty	2,880 kgms.
Weight fully loaded	4,800 kgms.

Three of these machines have been furnished to the Italian Ministry of Transports.

Handley-Page London-Paris and Brussels Air Services

On the Handley-Page London-Paris and Brussels Air Services between September 2, 1919, and January 29, 1920, 924 passengers and 43,412 lbs. of freight have been carried over a distance of 65,293 miles.

American Ladies Fly from London to Paris

Four American ladies were flown to Paris in a Handley-Page aeroplane recently, and it is anticipated that air transport will be largely utilized by American tourists during the spring.

Air Force to Patrol Mesopotamia Lines

London.—Five hundred officers and men of the Royal Air Force have replaced 36,000 troops for the purpose of border patrol duty in Mesopotamia. The future military policy of the British Government will be to cut down the infantry and cavalry arms of the service and to hand their duties over to a smaller number of airmen. By this way, it is believed, the nation will be saved many millions of dollars a year.

Egypt soon will be the principal base for British military and commercial aviation, General Sir Frederick H. Sykes, Controller-General of Civil Aviation, said to-day. At present there are in Egypt eight air squadrons.

Aviation in Switzerland

The Federal Council has issued a decree regulating aerial navigation in Switzerland. Traffic is free on Swiss territory in time of peace, but it can be suspended or locally limited for military reasons or reasons of public safety. The Federal Council reserves for itself the right to decide obligatory aerial routes and to fix the places of landing. A special permission is necessary for machines fitted with a wireless apparatus. Aerial transport enterprises will be subjected to the control of superintendents. Should these enterprises be of foreign origin, permission will only be given them on certain conditions. The decree also forbids the transport by air of money, munitions and explosives over Swiss territory. These measures will come into force on April 1, 1920.

British Aeroplanes for South America

London.—Handley Page, who is famous as the producer of the giant British bombing planes, has completed negotiations for establishing an aerial mail and passenger service in South America.

From the tropical Brazilian town of Pernambuco the route lies south along the Atlantic seaboard for 2,600 miles to the gay and festive Argentine capital, Buenos Ayres. Between those two terminals there will be ten other ports of call, the principal cities along the coast, dividing the flight into eleven easy stages.

After leaving Pernambuco the planes will stop at the Brazilian cities of Macelo, Bahia, Caravellas, Victoria, Rio Janeiro, San Paulo, Fliroanopolis, Porte Alegre, Pelotas, and the last halt before Buenos Ayres will be at Montevideo, Uruguay.

The longest flight will be 325 miles, between Bahia and Caravellas, and the shortest between Pernambuco and Maceio and Montevideo and Buenos Ayres, 125 miles each.

At first there will only be daylight flying, making the whole trip take three days from end to end. But that is six days less than the present mail-boat service.

When flying at night is introduced the whole journey will only take about thirty-six hours.

Handley Page's representatives expect to get ample cargoes as soon as the route is opened. Important business mail will be attracted by the speed of transmission, and the charge per letter for the whole trip probably will not be more than seventy cents.

The short stages planned will allow the planes to carry light supplies of gasoline and oil so there will be plenty of space for parcel post and passengers. American and South American tourists, as well as commercial travellers between the Brazilian and Argentine capitals, are expected to make frequent use of this comfortable and enjoyable way of getting about."

ELEMENTARY AERONAUTICS
and MODEL NOTES

By John F. McMahon

A. R. O. G. 36″ Model Tractor Monoplane

The model shown in the accompanying cut is of the modern light weight long distance racing type which is used by model flyers in the important races about the country.

This model weighs less than four ounces when completed and as the parts are small in cross section the builder should exercise care in building and flying it. The wing has an area of 216 sq. inches or 1½ sq. ft., which figures out at less than 3 ounces per sq. ft., a light loading indeed.

Main Plane

The main plane should be made carefully. The ribs are cut from 1/32″ thick Holley or Birch and are of the solid type. The spars are 1/16″ x ¼″ spruce and when assembled are laid on edge. The ribs should be slotted to receive and slide along the spars to their proper positions and then glue in place. The edge is 1/16″ bamboo which is slit to this size and sandpapered to a smooth finish. This edge is then glued to the edges of the ribs. "Ambroid" is best for this purpose, as it soon sets hard and no binding with thread is necessary Notice that the trailing edge is missing in the center where it would pass over the motor stick. The reason for this is to allow the wing to rest on the rear main spar to give the wing an angle of incidence necessary. for proper adjustment to flight. When the wing is completely assembled it should be covered with gold-beaters' skin, which can be purchased from large drug stores. This skin is extremely light in weight and when doped shrinks up taut and presents a perfect surface and is tough. If gold-beaters' skin is not procurable a light tissue paper should be used. The wing should be covered top and bottom.

Tail and Rudder

The tail and rudder are liberal in size to insure perfect control of the model while in flight, as tractors are cranky affairs and the control surfaces must be large enough to hold the model from a tendency to turn sharply and nose dive to the ground. These parts not lifting or helping in any way to carry the load should be as flimsy as possible and all unnecessary weight eliminated to assist in keeping the center of gravity near the front of the model. Owing to the length of the motor stick and the length of the rubber used the center of gravity is located at a point about midway along the stick. The framework is split bamboo 1/16″ round bent to the radii shown in the drawing. The parts should be covered as before, on both sides to present a perfect surface. The tail and rudder are then fastened to the extreme rear end of the motor stick.

Motor Stick

The motor stick is a piece of spruce, straight grained, 3/16 x ⅜″ and 33″ long. A combination motor hook and tail skid shaped from No. 22 steel piano wire to the shape shown, is fastened to the rear end of the stick, a bearing for the propeller to the front end. This bearing is a sheet of thin brass with a piece of 1/16″ tubing soldered to it for the propeller shaft to revolve and also to take the thrust of the propeller and the pull of the rubber.

Landing Chassis

The landing chassis is formed from steel wire as shown in the sketch and the joints are soldered together. The axle is soldered to the apex's of the two "V's." To assemble it should be slipped over the motor stick and held in place by rubber bands. The wheels are 3″ in diameter and ⅛″ thick. These can be cut from wood or cork, but must be light and strong. A piece of tubing is glued into the hub to allow the wheels to revolve freely on the axle.

Propeller

The propeller is 12″ diameter and a medium pitch. By this I mean not of the high pitch racing type but low enough to guard against the torque of the propeller tending to turn the model over. It would be a good idea to make two or three propellers of different pitch and use the one showing the best results. The propeller must be balanced carefully and if coated with varnish be careful that the blades do not warp.

Rubber Motor

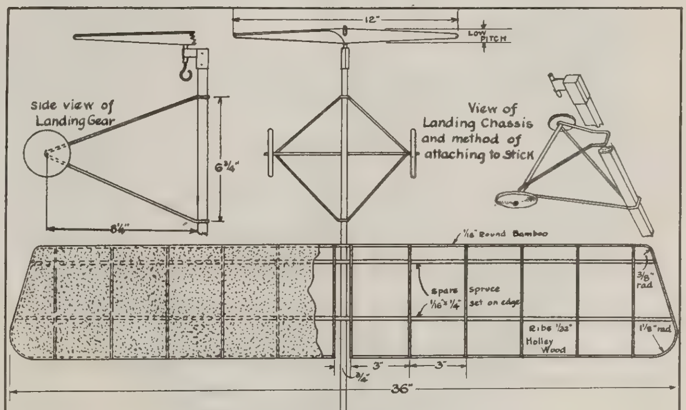
The rubber motor consists of 14 strands of ⅛″ flat rubber, but experiment might prove that this amount can be reduced somewhat.

To fly the model twist the rubber a little by turning the propeller a few revolutions to take up the slack and gently glide the model into the wind. It would be advisable to select a spot having high weeds or grass growing to protect the model when landing from damage. If the model makes a perfect glide it is ready for full flight and the rubber can be full, but if it dives to the ground nose first the main plane should be moved forward a trifle or if it should climb abruptly and then set on its tail, the plane should be moved to the rear, however this can be determined by the builder.

Models of this type can fly for long distances and if constructed as outlined should make distances of 1,500 feet and over.

Model enthusiasts are planning many contests for the coming year and if the interest shown at the Aero Show held in the Seventy-first Regiment Armory can be taken as a guide, the model flyers of the East will have everything their own way this year.

To assist the model builders I will have a new type of model in each issue with full instructions regarding construction. I do not expect the readers to make every model as it appears but to make those that appeal to them. If parts of



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

It's a Secret

The New York City government officials took King Albert upon a high air trip, and showed him all the kingdoms—I mean the scenery—of the Greater New York; but I don't know what they "offered" to him.—*Paper and Ink.*

One Higher

"Guess my dad is better than yours," asserted Archie. "The king touched him on the shoulder and made him a knight."

"Nothing to that," scoffed Willie. "A feller hit my dad on the head and made him an angel."

A Kiwi! What!

"Don't barrel-roll, I beg of you,"
  Her parting words had been.
So Sonny always nosed her down
  And let the old ship spin.

"Those awful side-slips, dear, I fear
  Will be the death of you."
So Sonny comforted his ma
  And only did a few.

She worried him to death almost
  With warnings day and night
Against reverses, loop-the-loops
  And spirals that were tight.

"Fly low and slow, my darling son,"
  His anxious parent said,
If Sonny followed her advice
  He'd soon be with the dead.

"Be careful, darling boy of mine,
  And do not go so fast."
If Sonny's motor slowed and died,
  His days would soon be past.

"Don't jazz too long up in the air,
  You're sometimes gone for hours."
But Sonny one sweet day bumped off.
  Now please omit the flowers.

—*Kay-det.*

Not An Aeroplane

Bacon—Been away?

Egbert—Yes, just made a flying trip South.

"Oh, did you go in an aeroplane?"

"Certainly not; I went down on the train."

"Well, I can't understand how anybody can call riding on a Southern train flying."—*Yonkers Statesman.*

Two fair young stenographers at the flying field were talking about their work. "Isn't it fierce," said one, "the amount of work we are getting now?"

"Fierce," retorted the other one, "I should say so. Only yesterday I typed so many letters that I ended my prayers last night with 'This for your information and immediate action.'"

It Happens in the Army

A young adjutant flourishing a telegram—"What do you know about this bird? Wiring for an extension of his A. W. O. L."—*Carry On.*

An Alarming Symptom

"There's something wrong with our girl reporter."

"How so?"

"She positively refuses to loop the loop in an aeroplane."

"Well, well!"

"I fear the morale of our reportorial staff is not what it ought to be."—*Birmingham Age-Herald.*

Plane of Information

Aviation Student—Do you call that a pretty ship?

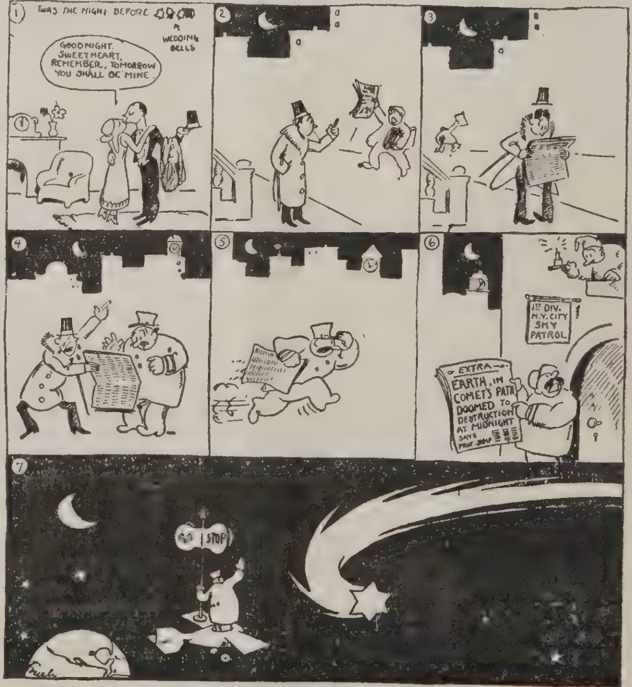
Instructor—Well, no; it has a rather plane appearance.

There's a Reason

Dugan (watching an aeroplane flying overhead): "Casey, I would sure hate to be up there in that aeroplane."

"Sure," replied Casey, "an' I would hate to be up there and not be in an aeroplane.

Mayor Hylan's Sky Cops


1
TWAS THE NIGHT BEFORE
WEDDING BELLS
GOOD NIGHT. SWEETHEART, REMEMBER, TOMORROW YOU SHALL BE MINE
2
3
4
5
6
1ST DIV. N.Y. CITY SKY PATROL
EXTRA
EARTH, IN COMET'S PATH DOOMED TO DESTRUCTION AT MIDNIGHT SAYS PROF
7
GO | STOP

Courtesy N. Y. World

(*Continued from page* 48)

$539,53, leaving available for purely operating purposes, $311,447, to continue the service to the end of the present fiscal year. This expenditure of $539,053 includes the purchase of certain larger planes for the Chicago service, the equipping of landing fields, and the salvage which the Government would have had to sacrifice at a few cents on the dollar, or in the end would have proven unsuitable for military aviation needs.

With the $3,000,000 recommended in this estimate, the department can make a tremendous expedition in the dispatch of first-class mail, not only to the cities between which the aeroplane service operates, but practically all other cities having direct rail connection with the cities served by the air mail.

The sum of $3,000,000 is needed to inaugurate and maintain during the fiscal year ending June 30, 1921, the following Aerial Mail Service:

Extend New York-Chicago route west to Pacific coast at cash operating cost of..............	$1,043,363
Extend New York-Washington route from Washington to Atlanta at cash operating cost of...	461,929
Establish and operate a route from Pittsburgh, Pa., to Kansas City, Mo., at cash operating cost of	461,929
Maintain operation of the line from St. Paul and Minneapolis via Chicago to St. Louis at cash operating cost of	282,452
Purchasing necessary additional equipment and laying out landing fields where needed for the proposed extensions	1,070,500

The appropriation that will be required simply to continue after June 30, 1920, the operation of the air mail service, not providing for any extension, will be as follows:

New York to Omaha, 1,150 miles..............	$575,920
New York to Washington, 200 miles	120,000
Twin Cities to St. Louis, 600 miles.............	282,452
Rebuilding 20 salvaged war De Haviland planes and engines, and field improvements..........	233,028
	$1,211,400

This cost of operating the air mail service is at the rate of 90 cents per mile of operation, divided as follows: Overhead, 17 cents; flying, 30 cents; maintenance, 43 cents.

Unethical Acts of Few Individuals Which Brought Condemnation of Aeronautic Industry Deplored

The force of the country-wide recommendations for the extension of the Aerial Mail was partly lost when Congress found evidence that employees and some members of the Manufacturers Aircraft Association were advocating Aerial Mail appropriations as government subsidies to assist the Association which, as stated in our editorials in the February 9th and February 16th issues of AERIAL AGE, had been condemned by the Senate Committee as "vicious and designed to reap large profits by taking adventage of the Government".

Congress is too busy to investigate, and does not know that the Association includes less than a dozen, out of approximately fifty firms which form the American aeronautic industry. Only a few of the members of the Association have indulged in "pernicious lobbying". The other members, and the preponderance of firms which form the aeronautic industry, but are not connected with the M. A. A. sincerely deplore the unethical actions of the few employees and members of the M. A. A. which brought condemnation to the entire aeronautic industry.

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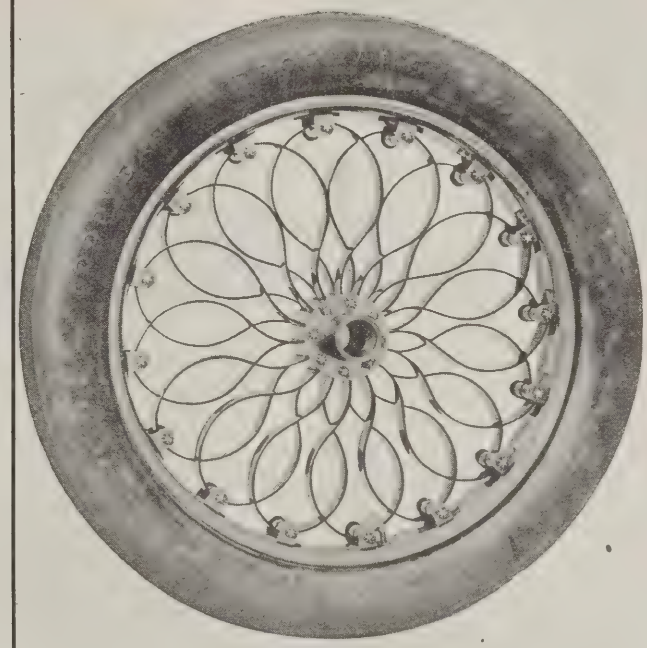

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AERIAL AGE WEEKLY

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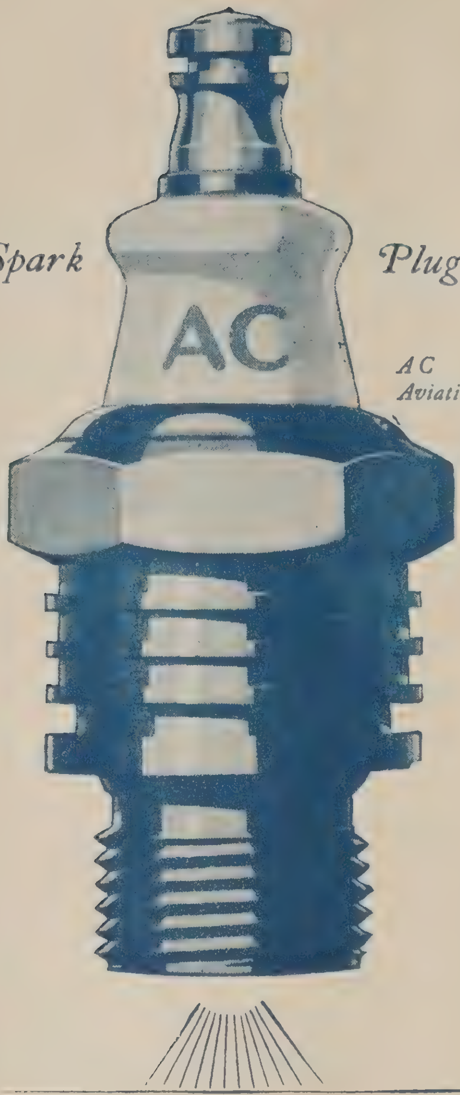
Above the Swiss Alps

Third Pan-American Congress to Be Greatest Aeronautic Event Ever Held

BLISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
Domestic, $4: Foreign, $6. Entered as second-class matter March 25, 1915, at the Post Office at New York under the act of March 3rd, 1879

The Standard Spark Plug of the World



SOME manufacturers might be satisfied with a spark plug so good as to be adopted as standard equipment for the Liberty engine. We realize, however, that the Liberty engine is only a prominent milestone on the march of aviation progress. Consequently, we are continually developing AC Spark Plugs, for airplanes, that will be equal to any test that the future may impose.

Champion Ignition Company, FLINT, *Michigan*
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ATLAS WHEELS

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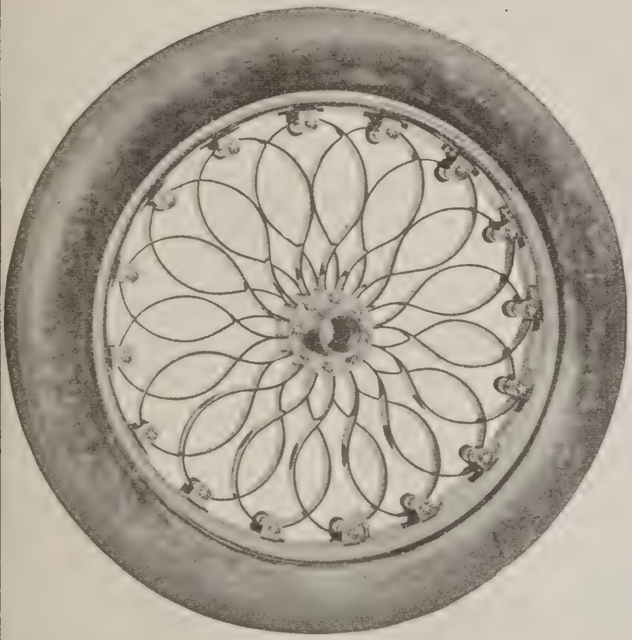

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AERIAL AGE WEEKLY

VOL. XI MARCH 29, 1920 NO. 3

TABLE OF CONTENTS

PAGE
Third Pan-American Congress to be Greatest Aeronautic Event Ever Held 79
Revolutionary Improvements In Aeroplane Construction Announced by Handley Page 80
The News of the Week 81
The Aircraft Trade Review 83
Orenco Commercial and Military Types 84
Aerial Photography as Applied to Topographical Surveys 87
Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures 89
Naval and Military Aeronautics ... 91
Foreign News 92
Elementary Aeronautics and Model Notes 93
Aeronitis 94

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167

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THIRD PAN-AMERICAN CONGRESS TO BE GREATEST AERONAUTIC EVENT EVER HELD

THE extensive preparations which have been made for the Third Pan-American Aeronautic Congress were announced by Major Reed G. Landis, secretary of the Aerial League of America yesterday.

Thirty-two countries, 400 aero clubs and five thousand other organizations and representative industries have been invited to send delegates to this Congress, which is to be held at Atlantic City, May 20th to May 30th.

Commodore Louis D. Beaumont, member, Board of Governors, Aero Club of America, the Chairman of the Commission, organizing the First Aerial Derby Around the World and Major Charles J. Glidden, the originator of the Glidden Tours and President of the Aerial Touring Association, who started for the trip around the world last October, have personally extended invitations to the authorities, aero clubs and other organizations of all the countries visited.

Alberto Santos-Dumont, the pioneer Brazilian inventor and aeronaut who spent over half a million dollars in developing the sport of aeronautics since 1901, when he first piloted a self-invented dirigible around the Eiffel Tower in Paris, is the Chairman of the Committee in charge of the Congress.

The Congress is held under the auspices of the Aero Club of America, the Pan-American Aeronautic Federation, the Aerial League of America, the Liga Aerea de Cuba, the Aerial Touring Association and the Aero Club of Atlantic City.

Mr. Santos-Dumont, who is Vice-President of the Aero Club of America and President of the Pan-American Aeronautic Federation states that "aerial transportation and aerial sports will knit the states of the Western Hemisphere into an integrally united, co-operating and friendly combination, allied for well-being in sport, trade and commerce, as well as for strength in time of possible war."

As chairman of the Pan-American Aeronautic Committee he has been travelling through South and Central America, creating interest in aeronautics.

Will Open New Epoch in Aerial Sport

This Congress will open a new epoch in aerial sport which has been dormant since the beginning of the war. As there are eighteen international and national contests being organized, with prizes amounting to over $2,000,000, open to American pilots holding the international pilot certificate, and the Aero Club of America alone has issued eight thousand of these pilot certificates, and Great Britain and France and Italy have issued over ten thousand pilot certificates each, the stupendous aerial contests being organized are assured of success. The regulations for the Pan-American Aerial Derby, the Aerial Derby Around the World and the Aerial Circuit of the Atlantic are to be discussed during the Congress at Atlantic City.

Pan-American Countries Placing Large Orders for Aircraft

With the Latin American countries spending millions of dollars in aeronautics, the Pan-American aeronautic movement, which was started in 1912 by Aero Club of America officials, has grown to mean a great deal to the United States, British, French and Italian Aeronautic industries. The orders from Latin American countries received by the Curtiss Aeroplane and Motor Corporation amount to $500,000.

International Exhibits Already Assured

Among the exhibits already assured, which make the Exposition international in character are the following aeroplanes: the latest Curtiss, Caproni, Avro, Sopwith, Bristol, Lincoln-Standard, HandleyPage, "Ace," Farman and Breguet, There will also be a Lawson exhibit. The motors include leading American, French, English and Italian types.

A twin motored, seven passenger French Zodiac dirigible and an 80,000 cubic feet racing spherical balloon, like those to be used in the Gordon Bennett Balloon Trophy contest, will be included in the lighter-than-air exhibit.

All Records in Sale of Aircraft for Sport, Pleasure and Transport to Be Broken

It is expected that all records in the sale of aircraft for pleasure, sport and transport will be broken at the Aeronautic Exposition which will be held at the Steel Pier, Atlantic City, during the Congress. This Exposition, and contests, and other events to be held at Atlantic City beginning with May 20 will interest hundreds of thousands of people in aeronautics. The Atlantic City plan will permit actual demonstrations of aircraft to prospective buyers. This plan will greatly facilitate the work of selling aircraft to prospective buyers, who after seeing the aircraft exhibited on the Steel Pier and seeing them in flight during the contests, can proceed to the beach or the aerodrome and get a ride on the craft he or she has chosen and will be able to place the order there and then for the craft selected.

A great many people who did not attend the Chicago and many who have just become interested and who probably would not go any further in aeronautics this year, will go to Atlantic City and order planes for use in the summer. Representatives of college groups will look over balloons for the balloon contests to be held in the fall.

The Convention aims for the first time in the history of aeronautics to permit thorough discussion of each of the important phases of aeronautics so that people interested in each phase may acquire all the information available on the subject.

Governments, Aero Clubs, Sporting, Scientific, Industrial and Civic Organizations Invited

The program is most thorough and complete. Tens of thousands of people of different lines of human endeavor related to aeronautics are invited to attend. For instance, on the day when the "Large Dirigible and Its Value for Transportation" is discussed, the representatives of railroads, express, steamship and other transportation organizations are invited to attend.

For the illustrated address on "Aerial Forest Patrol," the Forestry Department of every State are invited. For the discussion of the "Work of Aerial Police Squadrons, and Why

Every City Should Have One," the Police Commissioners of all cities are invited.

For the illustrated address on, and consideration of "Aerial Mail Plans," the Chairman of Post Office and Post Road Committees of House of Representatives and Senate, and Postmaster General Burleson and 26,000 United States postmasters, and Chambers of Commerce and 13,000 cities are invited to attend.

Likewise for the illustrated address on the "Need of Municipal Aerodromes, and the Part to be Played by Aircraft in City Planning," the Chambers of Commerce and City Planning Commissions of 13,000 cities are invited to attend. Those present will be given carefully prepared plans telling how to establish aerodromes and making them self-supporting.

For the demonstrations and illustrated addresses on the "Value of Aircraft for Advertising by Day and by Night," all national advertisers and advertising agents are invited to attend. For the discussion of "Pan-American Aerial Transport," the commissions of the twenty Latin-American Republics are invited to attend.

For the discussion of "Aerial Navigation Instruments for Flying Over Land and Water," aviators, navigators, scientific instrument makers and aeronautic experts are invited to attend.

For the addresses on "Aerial Photography," all the photographers, professional and amateur, and makers of photographic apparatus are invited to attend.

For the addresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic Survey," all people interested in exploration and surveying are invited to attend.

For the addresses on "Need of Broader Attitude Regarding Insurance for Aircraft and Aviators," all the insurance companies and agents are invited to attend.

For the discussion of intercollegiate aeronautics 600 universities and colleges are invited to send delegates.

For the addresses on "Aerial Jurisprudence—Aerial Laws and Regulations of Air Traffic," all lawyers, traffic commissioners and police authorities of different countries are invited to attend.

The engineers are invited to attend the aeronautic engineering meeting when basic problems of aeronautic engineering are to be considered.

100,000 Booklets of First Aerial Tours Mailed All Over the World

The First Aerial Touring Congress will be held at Atlantic City during the Third Pan-American Aeronautic Congress, and the sixty aero clubs are sending three delegates each and the 2000 people who have already bought or ordered aeroplanes in the United States are invited to this Congress.

The Aerial Touring Association, under whose auspices, the Aerial Tours are being organized, has already mailed out 100,000 booklets describing the proposed aerial tours to be organized in the United States, South and Central America and European countries. Major Charles J. Glidden, famous organizer of the Glidden Automobile Tours, who has been travelling around the world as Executive Secretary of the Commission organizing the First Aerial Derby Around the World and laying the foundations for aerial tours around the world since last October is to return to the United States early in May to take charge of organizing the aerial tours. He will be the chairman of the Aerial Touring Congress.

Contests With Large Prizes Under Consideration

Plans are under consideration for extensive contests with large prizes to be held at the Atlantic City Airport during the Congress and Aero Exposition. Before deciding on the extent of the contests the committee in charge wants to assure itself that there are a sufficient number of pilots with suitable aircraft available, to avoid a repetition of what happened last year when close to $100,000 offered in prizes went begging because pilots could not get deliveries of aeroplanes and balloons. A few pilots who succeeded in getting aeroplanes were so busy making money carrying passengers at $25 for a short flight that even prizes amounting to thousands of dollars did not tempt them. If the outlook for entries with suitable aircraft is good then a series of contests with large prizes will be organized.

Members of Aero Club of America, Aerial League of America, Affiliated Aero Clubs, Exhibitors, and Contestants Invited to Official Daily Luncheons to Be Addressed By Leading Authorities

Members of the Aero Club of America, Aerial League of America, Aerial Touring Association, Aero Club of Texas, Aero Club of Atlantic City, other affiliated Aero Clubs, and representatives of manufacturers, and other organizations are invited to attend the daily official lunches to be held during the Congress, and meet the delegates of the thirty-two countries and all national aeronautic, scientific, educational and civic organizations coming from different parts of the world. The world's leading authorities will address the official lunches.

The Governments and Aeronautic, Sporting, Scientific, Industrial, and Civic organizations of the United States and all the countries in the world, excepting Germany and her allies, are invited to send representatives to attend this great aeronautic event. On arrival at Atlantic City these representatives will register at the offices of the Convention located at the following Atlantic City hotels: Hotel Traymore, Hotel Chalfonte, The Breakers Hotel, Hotel St. Charles, Hotel Marlborough-Blenheim, Hotel Chelsea, Hotel Alamac, Hotel Dennis and Hotel Haddon Hall.

Representatives of the Convention Committee will be at the Bureaus of the Aeronautic Convention at the above-named hotels and will issue the official badges which admit the bearer to the Aero Exhibition on the Steel Pier, the judges' enclosure during contests, and to the airport and seaplane stations where the aircraft and motors will be demonstrated.

All communications until May 20th, should be addressed to Alberto Santos-Dumont, Chairman, Aeronautic Congress, 280 Madison Avenue, New York City.

REVOLUTIONARY IMPROVEMENTS IN AEROPLANE CONSTRUCTION ANNOUNCED BY HANDLEY PAGE

REVOLUTIONARY improvements in the construction of aeroplanes, which will make it possible to get the same performance that we get from present-day aeroplanes for one-third of the power, were announced by Mr. Handley Page on March 23 at the joint meeting of the Aero Club of America and New York Electrical Society. The details of these revolutionary improvements were not disclosed on account of pending patents.

The great economic value of this improvement is made evident by Handley Page's statement to the effect that it will be possible to build an aeroplane equipped with only 25 horsepower, 18-foot wing span, which will be capable of carrying two people five hundred miles. Again, that the present twin-motored Handley Page biplane when constructed by the new method will give the same performance with only 300 horsepower, or one-third of the present horsepower.

This large decrease in horsepower required to operate aeroplanes and the corresponding saving in weight and cost of fuel not only increase the ratio of useful load, but also greatly decrease the cost of operation.

In other words, this new development will make it possible for aeroplanes to complete economically with the other means of transportation in carrying passengers, mail, express and freight!

Handley Page, in his interesting address, reviewed the evolution of transportation from the earliest stages, and said in part:

"Let us briefly review then the stage to which mechanical transport had reached before the present flying era. Speed on the ground was about 100 miles per hour, although some special experimental trains were built and operated near Berlin about fifteen years ago which attained a speed of 120 miles per hour. On the ocean the fastest torpedo boats had reached speeds of between 40 and 50 miles per hour, and both these means of transport had reached the economical limits of weight per horsepower development, and for further progress man had to turn to the new element, namely, the air, the invention of which had been made possible by the development of the gasoline motor.

"Aviation in the early days was a case of managing to keep off the earth at all cost, but without any thought of efficiency. The weight per horsepower was in the neighborhood of 40 and 50 pounds, the modern starting point of successful flights for the Wright Brothers in this country in 1903. Then followed the improvement of machines from an efficiency point of view, the stream lining of the body, the improvement of plane areas, the reduction in weight per horsepower of the motor, together with improved methods of carburetion. All these lessened the weight per horsepower of the air vehicle and permitted of the attainment of higher speeds. So from the old machines doing about 40 to 50 miles per hour, with a weight per horsepower of 40 to 50 pounds, we have progressed to the modern scout, which only weighs seven or eight pounds per horsepower all told, and has a top speed of 150 or 160 miles per hour in still air.

"The millions which have been spent in every country in air development have made this great progress possible and aircraft movement is exceedingly fortunate in that amidst the great suffering caused by the war the aircraft industry

(*Continued on page* 88)

THE NEWS OF THE WEEK

Plans Ten-Hour Flight Across U. S.

Cleveland.—Major R. W. Schroeder, of Dayton, Ohio, holder of the world's record for aeroplane altitudes, plans a ten-hour flight from San Francisco to New York late this summer, flying at a height of 30,000 feet which, he says, will permit him to attain a speed of from 350 to 400 miles an hour.

Schroeder, who made a record-breaking flight on February 26, reaching an altitude of 36,130 feet, in an address to the members of the Glenn Martin Club recently said he would fly from the Pacific to the Atlantic Coast between sun up and sun down.

Plan Aerial Freight Line

The first aerial freight transportation line to be established in this country probably will be controlled by a British corporation. This became known in connection with the present visit of Handley Page, the British aeronautic designer and manufacturer.

The Handley Page Corporation was incorporated recently under the laws of the State of New York to engage in commercial aerial transportation. It is understood that the Handley Page Company will use Handley Page biplanes constructed in this country. The planes will be of the two and four-engined type.

The American Railway Express Company is keenly interested in the project, particularly with regard to the establishment of an aerial transport service between New York and Chicago.

It was learned that the nature of Mr. Handley Page's visit to Washington recently was to obtain, if possible, a mail-carrying contract from the Post Office Department which is now empowered to let mail carrying contracts to any aeronautical transportation company organized on sound lines.

The present negotiations arise out of the attempt made last November to ship express packages from New York to Chicago on the Handley Page biplane Atlantic, which was constructed primarily to fly across the Atlantic Ocean. On this occasion the Atlantic carried a consignment of packages from the American Railway Express Company.

Philadelphia Aero Show Postponed

The management of the Philadelphia Aero Show, which was to have been held from March 22 to 27, have decided to postpone the event until August when it will be possible to carry through an outdoor carnival as well as an indoor exposition, thereby enabling the exhibitors to demonstrate their machines locally and avail themselves of every sales opportunity.

Complete details will be presented in AERIAL AGE prior to the event.

Plan Balloon Ascent of 50,000 Feet

Professor David Todd, head of the Department of Astronomy at Amherst College, and Major A. Leo Stevens have announced a project to rise above the earth's atmosphere in a huge balloon of new type, in order to conduct astronomical, meteorological and pathological observations.

The balloon is under way at Omaha, Neb., and is to have a cubic gas capacity of 140,000 feet, as well as to be equipped with an elaborate installation of scientific devices for observing and recording, and special apparatus for making the great gas bag habitable at extreme altitudes.

Professor Todd, who with Major Stevens will be the only occupant of the balloon when it makes its first ascent in a few months, plans to go up 10,000 feet the first time, then 25,000, and finally from 45,000 to 50,000, which would be considerably above the record altitude attained in an aeroplane at Dayton recently by Major Rudolph Schroeder of the army.

Form Aero Club at North Carolina College

An Aero club has been organized at the North Carolina State College of A. and E. The purpose of the club is to stimulate interest in commercial aviation and to show that there is a need for a course in aeronautical engineering in the college. It is the first aero club to be established in a North Carolina college.

The officers of the club are: W. A. Sydnor, Jr., President; M. E. Beland, Vice-President; D. L. Smith, Secretary and Treasurer.

Aviator W. I. Jones Inspector for Aetna Co.

The aviation department of the Aetna Life Insurance Company has employed an Aviation Landing Field Inspector to check up on the Government Aerial Maps. This company is gathering all local data and compiling rates in view of the insurance of aircraft in all its branches.

W. I. Jones, Ensign U. S. N. R. F. C., has taken the position as Inspector of the Aviation Department.

Aero Club of Cincinnati Active

The Aero Club of Cincinnati, organized a few months, is rapidly becoming a live-wire organization for the promotion and advancement of aeronautics. Its active members are limited to pilots, observers, bombers and cadets of the Army and Navy Air Service and of the Allied Nations. A campaign is on for raising funds for establishing permanent quarters for the Club, and thus far has met with every success. The officers of the Club are as follows: President, Major Richard S. Davis; Vice-Presidents, Lieut. John P. Rogers and Capt. W. C. Lambert; Secretary, Lieut. Henry F. Gravenkemper; Treasurer, Cadet John M. Renner. Major Davis is on his way to join the Polish Air Force in their efforts to conquer the Bolsheviki.

Canada Plans Aerial Force

Ottawa.—Establishment of a Canadian aerial force for commercial as well as military use is planned by the Air Board, with the concurrence of the Dominion Government, which is expected to give aid with legislation and appropriations during its present session.

The estimate places the first appropriation needed at $1,000,000. The Government already possesses numerous aeroplanes and others are being forwarded here by the British authorities.

Enemy Aeroplanes Sent to the United States

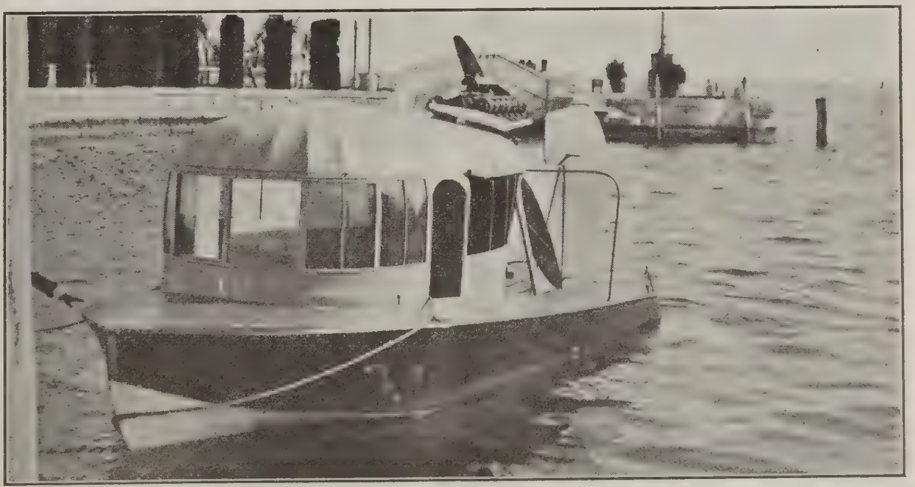
By the terms of the armistice agreement, Germany was obliged to turn over to the Allies, approximately 1700 aeroplanes, of which number the United States received 20%. A total number of 347 were sent to this country as war relics and for technical study. Included in the list are the A. E. G., Albatross, D. F. W., Friedrichschafen, Fokker, Gotha, Halberstadt, Hanover, Junker, L. V. G., Pfals, Roland, Rumpler, Rubild, Simens and Scheckert.

Northwest Aviators Form Organization at Fargo

Fargo, N. D.—Aviators interested in commercial flying met at the Powers hotel here recently and laid the foundation for the Northwestern Flying Club which is intended to cover the northwest in general.

W. A. Kidder, Curtiss representative of Minneapolis, was present and gave a talk on what should be expected of an organization of this kind.

The new club will adopt a universal insignia to be officially stencilled on the sides of aeroplanes operated by those



The Curtiss Scooter, a low draft boat with 400 H.P. Curtiss aero engine and aerial propeller, which give it a speed of 50 miles per hour who have passed the physical and flying examinations required by this club.

Cities and states will be urged to pass legislation governing altitudes at which flying can be done and when and where "stunting" is permitted. This is all expected to bring the public to realize that the rapid development of aviation hinges entirely upon their attitude toward the enforcement and observation of these rules.

Lieut. J. Earl Fladeland of Portland has undertaken to temporarily direct the affairs of the new organization and Paul Elliot of Fargo will act as secretary-treasurer until a general convention is called next winter during the automobile show at Minneapolis.

New Cincinnati Flying Field

Through the efforts of Charles E. Lay and other citizens Cincinnati will very shortly have a first-class landing field. It is to be located at the corner of Duck Creek Road and Deerfield Pike, in the heart of the residential section and is convenient to all of the more important suburbs of Cincinnati.

Mr. Lay is president of the Cincinnati Aircraft Company which is engaged in aeroplane sales, passenger carrying, and exhibition work.

William Hurn, Jr., is vice-president of the company, and Mr. M. H. Held is secretary.

Spokane News

Spokane, Wash.—The flying season has opened vigorously in the Inland Empire. Spokane is probably the only community in the Pacific Northwest where aviation was practicable throughout the winter and the Russell-Symons Company had a plane aloft almost daily throughout the winter months. Their landing field was high and dry regardless of weather conditions and fog rarely interfered with flying.

But with the advent of real spring weather additional aviators have trundled out their machines and three or four planes are in the air practically every day. A carlot of Curtiss planes was recently delivered in Spokane. One of these was taken over by Fred Hungate, a farmer and banker of Pomeroy, Garfield county, 100 miles south of Spokane, who secured his pilot's certificate in a Spokane aerodrome. Hungate flew to Pomeroy and was escorted part way on his journey by a squadron of planes. He has two large ranching properties so located that a day's journey by auto is necessary to cover them. With his plane he can land on one ranch 20 minutes after leaving the other.

The latest venture in aviation is the Parkwater Aviation Company, comprising D. Matthews, Samuel Stenstrom, Nathan Barnard and William Barnard. With one exception all are ex-army pilots. The firm has two machines and will add to the number. A four-machine hangar is planned.

Enforce Treaty As Regards Aviation

Paris.—A French technical commission has left Paris for Germany to see that the clauses of the Treaty of Peace relative to aviation are fulfilled. This commission is under the control of Colonel Dorand, who during the war was director of the technical section of the French Air Service. The members composing the commission are partly military and partly civil. Among the latter are Gustav Callois, former race driver, now attached to the Lorraine-Dietrich factory; Guerin from the Farman factory; Sossaulens from the De Dion Bouton Co., and representatives from the Morena, Gnome, and Renault factories.

According to the treaty of Versailles, Germany shall not construct any aviation material for war purposes. The object of the technical commission is to see that this clause of the treaty is observed.

Novel Oxygen Test

London.—A daring experiment bearing on aviation has just been made by Joseph Barcroft, assistant professor of physiology at Cambridge University. The question involved was whether it is possible to calculate the quantity of oxygen necessary to an airman at great altitudes.

Mr. Barcroft was shut up for six days in an airtight glass case about 7 feet high and 10 feet wide. This case was divided into two compartments, one fitted with a lounge, a chair and a table, and the other with a simple bed. At the foot of the bed was a pedalling apparatus consisting of the frame of a bicycle, from which the front wheel had been removed, and with a small back wheel with a brake attachment to enable Mr. Barcroft to get some physical exercise and do a certain amount of work.

During the six days he was in the cage Barcroft spent his time in work relating to the experiment, taking exercise on the bicycle and sleeping. He was kept under observation day and night to insure his personal safety, undergraduates taking turn to keep watch.

Although neutral nitrogen gas was continually introduced into the chamber, the air in it became gradually rarer in oxygen until it approximated the air at an altitude of 16,000 feet. The experiment is regarded as thoroughly successful.

Plan Aircraft Insurance Syndicate

Insurance against all hazards of the air in a syndicate strong enough to handle any and all demands is expected to result ultimately from preliminary steps towards the organization of the National Aircraft Insurance Association taken in New York City recently.

Enthusiastic representatives of five of the companies now writing this form of cover—Vice President N. S. Bartow of the Queens, United States Manager Cecil B. Shallcross of the North British & Mercantile and affiliated companies, Manager Edward Ely of the aircraft department of the Aetna Life and affiliated companies, Assistant Secretary C. C. Wright of the Fireman's Fund and Manager E. S. Martin of the aircraft department of the Home —gathered at the offices of the Home in New York and at length considered the status of the aeroplane as an extensive insurable proposition.

Pursuant to the conference Secretary Martin issued invitations to join the association to Walter G. Cowles of the Travelers, C. S. Timberlake of the Hartford Fire, Sheldon Catlin of the Insurance Company of North America, J. D. Lester of the Globe & Rutgers, G. H. Kehr of the National Liberty, F. C. Cauty of the Columbia and William R. Hedge of the Boston. All of the invitations were answered favorably and enthusiastically save by two, Walter G. Cowles of the Travelers and F. C. Cauty of the Columbia, so that there will be but two companies missing when the company representatives gather at the next meeting of the association.

The Association purposes to deal with all aircraft hazards including liability, property damage, collision, fire, transportation, theft, stranding or sinking of aircraft, passenger carrying, acrobatic, exhibition flying, instruction and demonstrating.

Edward Ely of the Aetna Life and affiliated companies, who has figured prominently in promoting the movement, announced that the Aetna group with its comprehensive facilities for insuring all classes of risks, is issuing aircraft policies covering the full range of protection incident to the ownership and operation of land or sea planes.

The Association agreed upon a plan of cooperation whereby pilots will be investigated, classified and the resulting information circulated among the members of the organization. The aircraft department of the Home has been established as the central information bureau with E. S. Martin as manager, who will compile the data submitted by the various companies.

The advisability of underwriting lighter-than-air machines also came in for a deal of attention and time. None of the companies represented, however, was ready to consider seriously the writing of such cover as they wish to acquaint themselves better with the real hazards of the air through experimentations with the plane before delving more deeply into aircraft insurance.

Mrs. A. B. Schmidt and ten weeks old baby daughter Evelyn about to take a flight in an Inland Empire Aerial Corp. machine at Butte, Mont.

The AIRCRAFT TRADE REVIEW

M. M. Titterington With Pioneer Instrument Co.

Mr. Morris M. Titterington, for five years chief engineer of the Aircraft Instrument Department of the Sperry Gyroscope Company, has joined the Pioneer Instrument Company as chief engineer.

While with the Sperry Gyroscope Company he spent several years in Europe, introducing the Sperry stabilizer there, and studying European instrument development.

Mr. Titterington has been in aviation work since the early days, having built a plane at his home in Texas in 1911. This plane he flew with a Ford motor which he had rebuilt.

Later he worked for the Curtiss Aeroplane Company in Hammondsport, N. Y., and took a course at the flying school there. Since that time his work has been closely connected with aircraft instruments.

Mr. Titterington has also had a wide experience with the interesting subject of aerial torpedoes, having been associated both with those the French developed and with those worked upon by this government.

Open Ohio Flying School

Akron, Ohio.—The Ohio Flying School and Transport Company has been incorporated to carry on commercial aviation on a large scale. The company is planning to do exhibition flying at fairs in all parts of the States of Ohio, Western Pennsylvania and West Virginia.

Regular aerial lines will be opened between this city and the principal cities of Ohio and also Pittsburgh. A. C. Johnson, formerly stunt instructor for the Government in California, will be chief instructor in the company's aviation school, which is located in Stowe, Ohio.

A completely equipped service will enable the company to take care of all transient flyers. The company's offices are located in the Central Office Building. Scott F. Worley is president; John F. Aston, vise-president, and Edwin L. Manthey, secretary-treasurer.

Curtiss Distributors Meet

During the New York Aeronautical Show, the Curtiss Aeroplane and Motor Corporation entertained its dealers and distributors from all sections of the United States at a dinner at the D.K.E. Club—the first aeroplane salesmen's dinner ever held in the world.

Representatives of more than thirty companies, organized to promote the sale of aeroplanes for commercial and pleasure purposes, were present at the dinner —practically every state in the Union being represented. The extremities of the country were represented by Paton MacGilvary, of Boston, Mass., Syd Chaplin of Los Angeles, Calif.; Howard Charlton of Portland, Oregon, M. K. Johnson of Montgomery, Ala., and B. L. Brookins of Tulsa, Okla.

W. W. Mountain, vice-president and general manager, acted as toastmaster. Other speakers were C. M. Keys, vice-president of the Curtiss Company and a member of the United States aeronautical commission that went abroad to investigate aeronautics; Frank Russell, plant manager; W. L. Gilmore, aeroplane engineer, and Finlay Porter, motor engineer at the Garden City plant; W. P. Anderson, factory manager of the Churchill street plant of the Curtiss Company; Walter P. Chrysler of the Willys-Overland Company, and Roland Rohlfs, Curtiss test pilot and holder of the world's altitude record.

Among the distributors in attendance were Paton MacGilvary of the Curtiss Aeroplane Company of New England, Boston, Mass.; P. L. Freeman of the America Trans-Oceanic Company, New York City; G. S. Ireland and J. A. Bottumly of the Curtiss-Eastern Aeroplane Company, Philadelphia, Pa; M. K. Johnson of the Curtiss-Johnson Aeroplane Company, Montgomery, Ala.; J. P. Davies of the Curtiss-New York Aeroplane Company, Buffalo, N. Y.; Floyd J. Logan, distributor for Ohio, Cleveland, Ohio; J. H. Thompson of the Thompson Aeroplane Company of Detroit, Mich.; G. G. Garrison of the Chattanooga Automobile Company, Chattanooga, Tenn.; W. M. Fagley of the Curtiss-Indiana Company, Kokomo, Ind.; W. D. Swaney, of the Curtiss-Iowa Aeroplane Company, Fort Dodge, Ia.; George W. Browne, Assistant Sales Manager of the Curtiss Aeroplane and Motor Corpn., Chicago, Ill.; B. L. Brookins and W. T. Campbell of the Curtiss-Southwest Aeroplane Company, Tulsa, Okla.; W. A. Kidder of the Curtiss-Northwest Aeroplane Company, Minneapolis, Minn.; I. B. Humphreys of the Curtiss-Humphreys Aeroplane Company, Denver, Colo.; Syd Chaplin of the Syd Chaplin Aeroplane Company, Los Angeles, Calif.; Earl P. Cooper of the Earl P. Cooper Aeroplane Company, San Francisco, Calif.; Lloyd G. Thompson of the Grand Island Aero Company, Grand Island, Neb.

These dealers and distributors have contracted for a volume of land machines and flying boats that will keep the Curtiss plants at Garden City and Buffalo busy during the next year. They have established flying fields, service stations, sales rooms and offices.

Convention of Curtiss Executives, Sales Representatives and Distributors held in New York City recently

ORENCO COMMERCIAL AND MILITARY TYPES

Single Seater Pursuit Fighter Type "B"

THE Ordnance Engineering Corporation have just issued a brochure descriptive of their commercial and military types, which contains some very interesting data.

The Four-Seater Tourister

The four-place tourister's most attractive feature is the double side-by-side seating arrangement that eliminates the feeling of isolation and lack of companionship usually associated with all planes of the tandem type.

Two passengers in the forward seats have plenty of room for freedom of movement and for their protection an automobile type wind shield is mounted forward of the cockpit. The pilot and his companion in the rear cockpit are provided with two separate and complete controls that enable either to guide the plane. By this arrangement the pilot can observe just how the plane is being handled and can instantly resume control in an emergency or near the ground.

The nicely streamlined body is pleasing in appearance and its finish is equal to the finest automobile both in attractiveness and serviceability. Parts are easily reached for making adjustments, repairs and installations. Main wings are identical in plan. Wing struts are all similar and interchangeable with one another, which means that only a limited number of spare parts are necessary. Standardization has been carried out wherever a duplication of parts would effect a saving, for new parts and fittings can always be promptly procured with the assurance of perfect fit.

General dimensions of the Type "F" are as follows: Span of both upper and lower wings, 38 feet; length, 24 feet 10 inches; wing area, 355 square feet. As the weight of the plane fully loaded is about 2,400 pounds, the weight per square foot is about 7 pounds. With a 150 h.p. Hispano-Suiza engine, the loading per horsepower is equal to about 16 pounds.

Type "A" Training Plane

The first Orenco aeroplane brought out in the latter part of 1916, the Type "A" dual control two-seater, was designed for the primary instruction of army pilots. Seats were arranged side by side, giving a distinct advantage over the tandem type, as it was possible for the pupil to see exactly how the pilot maneuvered in bringing about the different attitudes of flight, besides giving the instructor a better opportunity of correcting his pupils' faults.

A 105 h.p. Duesenberg engine was used in the Type "A." Its normal flying speed was seventy-four miles an hour and its low speed thirty-eight miles. The slow landing speed was a helpful factor in mastering the difficult art of making good landings in the initial stages of tuition.

General dimensions: Span, upper plane, 44 feet; lower plane, 34 feet; wing chord, 6 feet; gap, 5.5 feet; stagger, 14 inches; length, 26 feet 7 inches; height, 10.5 feet; wing area, 430 square feet.

Cross-Country Two-Seater, Type "C4"

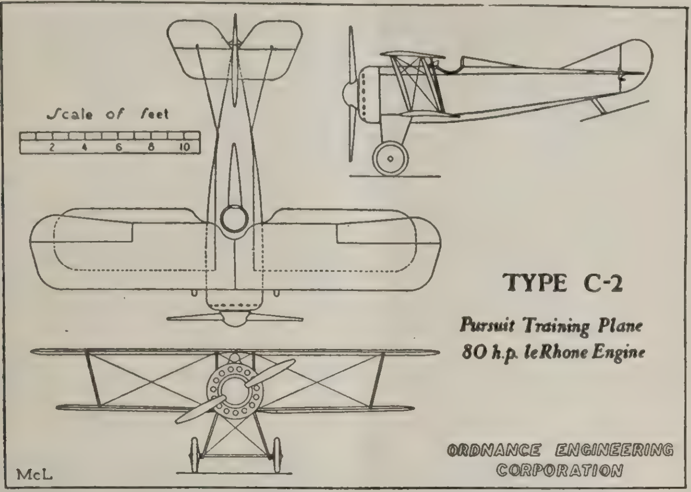
For cross-country flying the Type "C4" two-seater has a unique arrangement for carrying an extra propeller and wheel. In landing at strange fields, delay is sometimes caused by a broken wheel or propeller, and it is for this emergency that the "C4" was especially designed to carry such parts in compartments at either side of the body. This type of plane is useful for flying instruction, cross-country touring, forest patrol and emergency services of a similar nature. The air-cooled rotary 80 h.p. Le Rhone engine is easily kept in running order and is economical in fuel and oil consumption.

The "C4" has a wing span of 30 feet, a length of 20 feet and an over-all height of 8 feet 7 inches. Its weight empty is 985 pounds and the useful load is 585 pounds. Fuel for 214 miles is carried. The speed is about ninety-five miles an hour near the ground; the landing speed is 38 m.p.h. An altitude of 5,000 feet is reached in 14 minutes 15 seconds.

Military Training Single-Seater, Type "C"

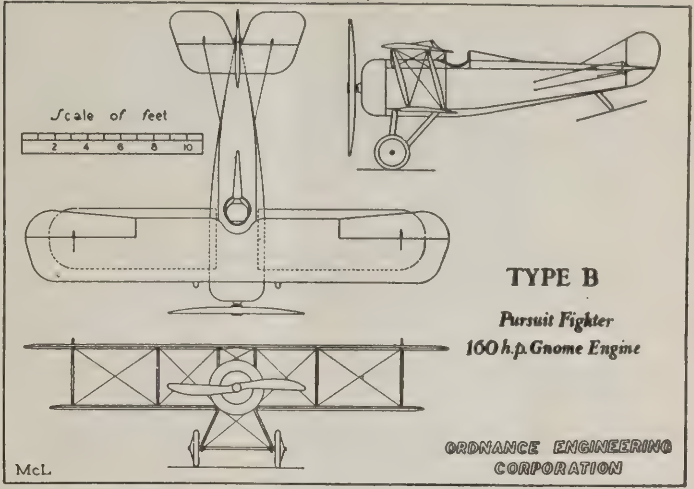
Successful performances of the Orenco Type "B" Pursuit Fighter led to its adaptation to a military training machine, the Type "C." The construction, dimensions and general appearance of the "B" machine were all duplicated in the Type "C" which was provided with an 80 h.p. Le Rhone

Orenco Primary Training Aeroplane Type "A"



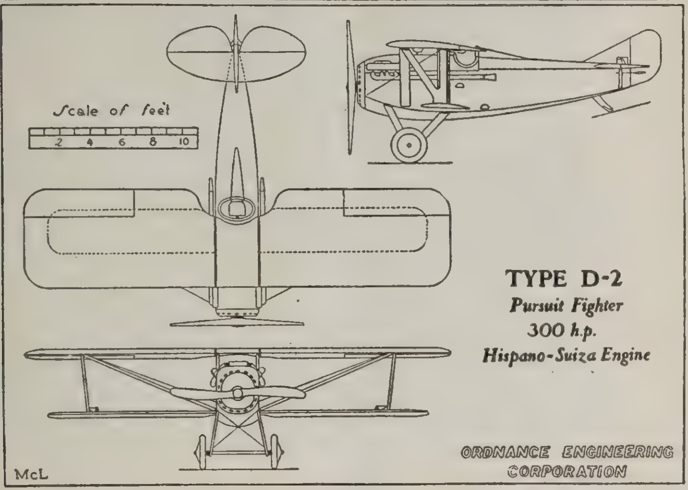
TYPE C-2

Pursuit Training Plane
80 h.p. leRhone Engine



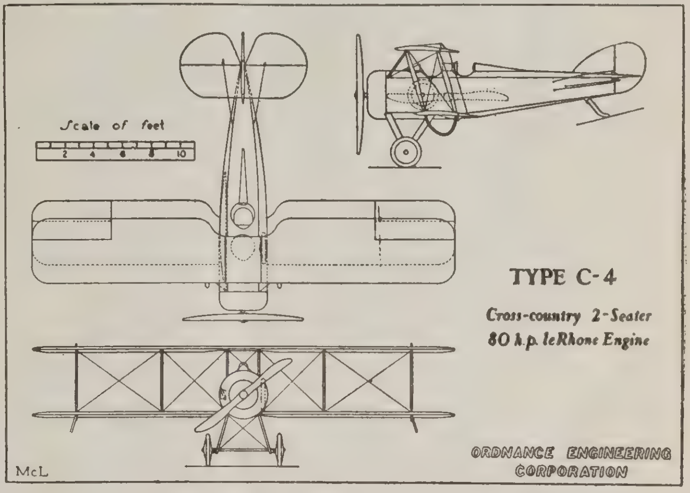
TYPE B

Pursuit Fighter
160 h.p. Gnome Engine



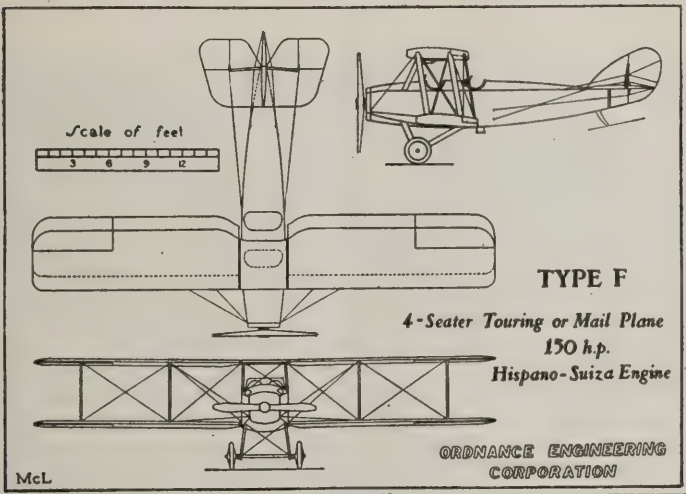
TYPE D-2

Pursuit Fighter
300 h.p.
Hispano-Suiza Engine



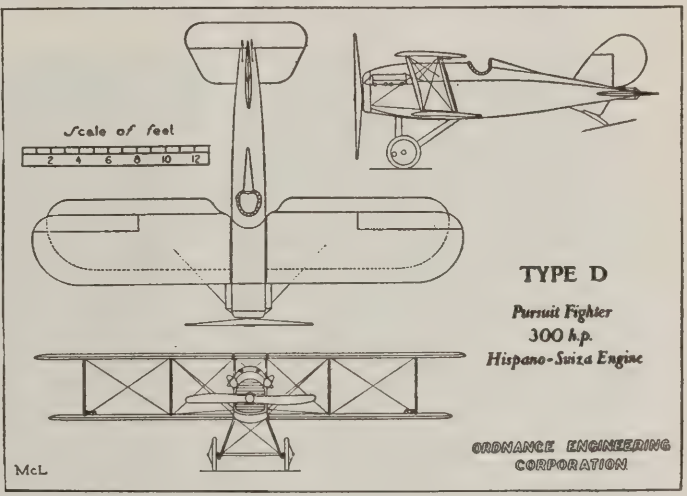
TYPE C-4

Cross-country 2-Seater
80 h.p. leRhone Engine



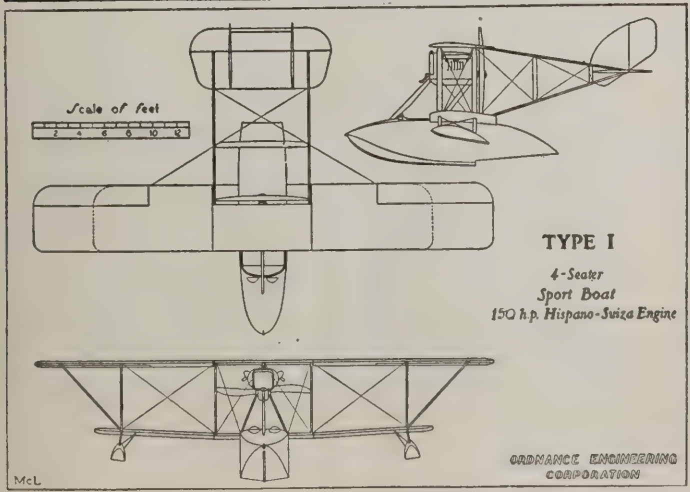
TYPE F

4-Seater Touring or Mail Plane
150 h.p.
Hispano-Suiza Engine



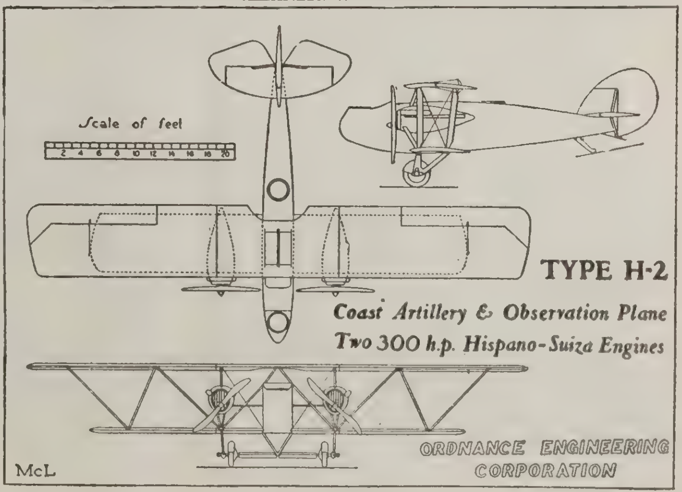
TYPE D

Pursuit Fighter
300 h.p.
Hispano-Suiza Engine



TYPE I

4-Seater
Sport Boat
150 h.p. Hispano-Suiza Engine



TYPE H-2

Coast Artillery & Observation Plane
Two 300 h.p. Hispano-Suiza Engines

rotary air-cooled engine in place of the original 160 h.p. Gnome.

All dimensions similar to the Type "B" except the stagger, which on account of the difference in engine weight is only 7 inches. The span of upper wing is 26 feet; lower wing, 23 feet; wing chord, upper, 48 inches; lower, 45 inches; area of wings, 180 square feet; length over-all, 18 feet 10 inches; height, 7 feet 4 inches.

Weight, 835 pounds. Useful load, 282 pounds. Fuel capacity, 98 pounds for two hours' flying.

Advanced Training Aeroplane, Type "C2"

Dimensions of the "C2" are identical with the Type "C" training aeroplane, but the "C2" is lighter in weight and has a higher useful load. It gets off the ground in a shorter run, carries 12 pounds more fuel and travels thirty miles further than the Type "C." For the purposes of advanced training, the "C2" is 6 miles an hour faster than the Type "C." A single pair of wing struts is used at either side of the body and the small simplified landing gear is designed to lessen resistance. As it is light in weight, the climb is rapid; 5,000 feet is reached in six and one-quarter minutes; 10,000 feet in sixteen and one-half minutes and 15,000 feet in thirty-five minutes. This climb is made possible by the light wing loading, 6.05 pounds per square foot.

Supplied with twin floats, the "C2" can be adapted for water work, thereby doubling its versatility with the addition of but few extra parts. Slight modifications, such as the adjustment of the lower wings so as to increase or decrease the stagger permit the use of a Gnome, Clerget or other engine of similar design.

This type of machine can be arranged to take-off from the deck of a ship. It rises so quickly and stops in so short a run that it is particularly well suited for use in restricted localities and is admirably adaptable for combined military and naval aeronautic training.

Pursuit Training Plane, Type "C3"

In outward respects the "C3" pursuit and acrobatic training plane is like the first of the "C" type aeroplanes. The differences exist only in some of the internal fittings which have been modified to facilitate their installation and replacement. The entire machine has been designed so that the work of adjustment and repair, features essential to safety in machines used for such severe service, is simplified to the highest degree.

Twin Engine Artillery Observation Plane, Type "H2"

Modern artillery operations are effectively increased in value by the employment of such aircraft as the Type "H2" observation aeroplane. Carrying a crew consisting of a pilot and two gunners this plane is one of the most efficient of war engines. A speed of 140 miles an hour is attained with the two 300 h.p. Hispano-Suiza engines.

The wing span is 56 feet for the upper plane and 42 feet lower; wing chord, upper, 8 feet; lower, 6 feet 7 inches; length over-all, 36 feet; height, 13 feet; gap between wings, 84 inches; stagger, 5 inches; wing area, 680 square feet.

Weight loaded, 5,832 pounds; in this is included a useful load of 2,470 pounds; 1,140 pounds of fuel are carried, sufficient for 450 miles' flight at full speed. Weight per horsepower, 9.2 pounds.

Landing speed forty-eight miles an hour. Speed at sea level, 140 m.p.h. Time required to reach an altitude of 5,000 feet three and one-half minutes; speed at that height, 133 m.p.h Time to 10,000 feet, eight and one-half minutes; speed, 128 m.p.h.

While primarily for observation the "H2" makes an efficient fighter. Its speed and armament make it the equal of any single-seater that might be matched against it in combat. The entire six guns are movable in all directions, a pair of guns well forward, one pair aft of the wings and a pair firing downward through an opening in the under side of the body.

Commercial 12-Seater, Type "H3"

Several features of the Orenco Type "H3" twin-engine aeroplane makes it a logical type for commercial uses where great weights are to be carried.

Seats are arranged for twelve passengers, all completely enclosed in a luxurious cabin provided with a window at each seat. The weight of the machine empty is 3,530 pounds and a useful load of 2,470 pounds can be carried. Fully loaded with 1,100 pounds of fuel sufficient for a flight of 422 miles, a speed of 140 miles can be attained.

The upper wing has a span of 56 feet and an 8-foot chord. Lower wing, 42 feet in span and 6½ feet in chord, giving a total supporting wing surface of 680 square feet. The ailerons compose slightly more than one-tenth of this area.

Two 300 h.p. Hispano-Suiza engines are located in streamline nacelles at either side of the body. In case one engine fails, horizontal speed can be maintained, a feature highly

(*Continued on page 98*)

DIMENSIONS of ORENCO AEROPLANES

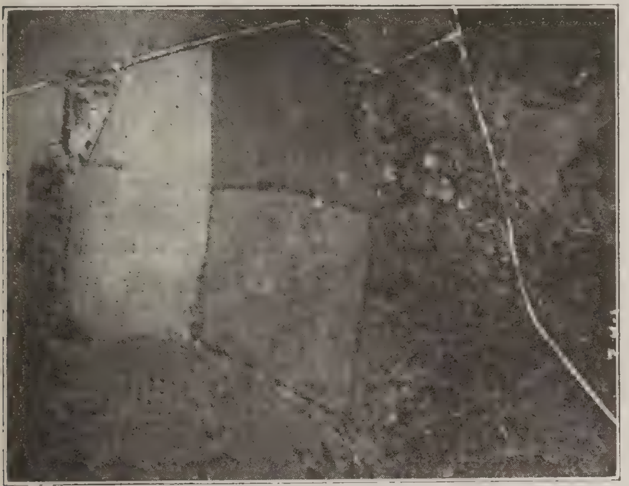
TYPE OF AEROPLANE	TYPE	No. of SEATS	WING SPAN		WING CHORD		WING AREA (including ailerons)			AILERON AREA	HORIZONTAL AREAS		VERTICAL AREAS		LENGTH	HEIGHT	GAP	STAGGER	DIHEDRAL ANGLE		INCIDENCE ANGLE	
			UPPER	LOWER	UPPER	LOWER	UPPER	LOWER	TOTAL		STABILIZER	ELEVATOR	FIN	RUDDER					UPPER	LOWER	UPPER	LOWER
			Feet		Feet & inches		Square feet				Square feet				Feet & inches		Inches		Degrees		Degrees	
PRIMARY TRAINING	A	2	44'	34'	6'	6'	258	172	430	40	32.8	24.6	5.5	12	26'-7"	10'-6"	66"	14"	1.5°	1.5°	3°	3°
PURSUIT FIGHTER	B	1	26'	23'	4'	3'-9"	102	78	180	17.9	12.2	13.3	2.35	5.4	18'-10"	7'-4"	44.5"	12"	0	0	2°	1°
MILITARY TRAINING	C	1	26'	23'	4'	3'-9"	102	78	180	17.9	12.2	13.3	2.35	5.4	18'-10"	7'-4"	44.5"	7"	0	0	2°	1°
ADVANCED TRAINING	C2	1	26'	23'	4'	3'-9"	102	78	180	17.9	12.2	13.3	2.35	5.4	18'-10"	7'-4"	44.5"	13.5"	0	0	2°	1°
PURSUIT TRAINING	C3	1	26'	23'	4'	3'-9"	102	78	180	17.9	12.2	13.3	2.35	5.4	18'-10"	7'-4"	44.5"	13.5"	0	0	2°	1°
CROSS-COUNTRY	C4	2	30'	30'	4'-6"	4'-6"	129	120	249	31.2	16.8	13.8	3.75	6.7	20'-0"	8'-7"	54"	15"	0	0	2°	2°
PURSUIT FIGHTER	D	1	30'	28'	5'	5'	142	119	261	27.6	15	17	4.8	7.9	21'-6"	8'-3"	52"	12"	0	0	2°	1.5°
PURSUIT FIGHTER	D2	1	28'	25'	6'-6"	3'	170	64	234	29	13.5	11.5	2.75	6	20'-8"	8'	49"	27"	0	0	2.5°	.5°
ARMORED FIGHTER	E	2	45'	45'	6'-6"	6'-6"	291.2	265.8	557	92.8	36.8	27.2	6.2	13.6	28'-7"	10'-2"	72"	0	0	0	3°	3°
INFANTRY LIAISON	E2	2	46'	46'	7'	7'	306.2	293.8	600	74	26.8	35.6	4.5	15.2	30'-7"	11'-10"	78"	22"	1.5°	1.5°	3°	3°
TOURING OR MAIL	F F2	4	38'	38'	5'	5'	182	173	355	41.3	26.7	21.6	4.26	9.6	24'-10"	9'	60"	12"	1.5°	1.5°	2°	2°
ARTILLERY OBSERVATION	H2	3	56'	42'	8'	6'-7"	432	248	680	68.5	33.3	34	11	32.2	36'-0"	13'	84"	5"	0	0	5°	3°
COMMERCIAL	H3	12	56'	42'	8'	6'-7"	432	248	680	68.5	33.3	34	11	32.2	36'-0"	13'	84"	5"	0	0	5°	3°
SPORT BOAT	I	4	38'	28'	5'-6"	5'-6"	185	132	317	30	24	22	21	12	25'-9"	10'-3"	69"	0	0	1.5°	2°	2°

TYPE OF AEROPLANE	TYPE	ENGINE		WEIGHT			RUN REQUIRED		FUEL CAPACITY	RANGE AT FULL SPEED	SPEED					TIME of CLIMB			LOADING	
		MAKE	H.P.	EMPTY	LOADED	USEFUL LOAD	TO TAKE OFF	TO STOP			LANDING	AT SEA LEVEL	AT 5,000 FEET	AT 10,000 FEET	AT 15,000 FEET	TO 5,000 FEET	TO 10,000 FEET	TO 15,000 FEET	PER SQ. FT.	PER H.P.
				Pounds			Feet		Lbs.	Miles	Miles per hour					Minutes & Seconds			Pounds	
PRIMARY TRAINING	A	DUESENBERG	105	1476	2167	691	400	300	240	306	38	74	72	66	—	15	44	—	4.8	20.6
PURSUIT FIGHTER	B	GNOME	160	985	1290	305	110	200	210	202	45	135	132	126	118	3-20	7	15-11	7.16	8.05
MILITARY TRAINING	C	LE RHONE	80	835	1117	282	145	150	98	200	40	102	96	90	81	6-50	18	40	6.2	13.95
ADVANCED TRAINING	C2	LE RHONE	80	748	1090	342	140	150	110	230	42	108	102	94	85	6-15	16-30	35	6.05	13.6
PURSUIT TRAINING	C3	LE RHONE	80	835	1117	282	140	150	110	230	42	102	96	90	81	6-50	18	40	6.2	13.95
CROSS-COUNTRY	C4	LE RHONE	80	985	1570	585	300	300	110	214	38	95	93	88	—	14-15	41	—	6.3	19.6
PURSUIT FIGHTER	D	HISPANO-SUIZA	300	1666	2432	766	250	350	330	275	50	147	144	139	132	4-20	8-54	16-45	9.3	8.1
PURSUIT FIGHTER	D2	HISPANO-SUIZA	300	1345	2256	911	225	400	353	330	55	165	162	158	151	4	8-30	13-50	9.64	7.52
ARMORED FIGHTER	E	LIBERTY	400	4090	5610	1520	400	500	215	120	60	120	115	98	90	6	18	40	10.08	14
INFANTRY LIAISON	E2	LIBERTY	400	3428	5046	1618	350	450	675	406	50	130	126	120	112	6	14	29	8.5	12.6
TOURING 4-SEATER	F	HISPANO-SUIZA	150	1477	2432	955	350	300	250	290	43	100	94	88	79	9	24	62	7.15	16.2
ARTILLERY OBSERVATION	H2	2-HISPANO-SUIZAS	600	3362	5832	2470	275	350	1140	450	48	140	133	128	117	3-30	8-30	17	8.56	9.2
COMMERCIAL	H3	2-HISPANO-SUIZAS	600	3530	6000	2470	275	350	1100	422	48	140	131	124	102	4-15	11	22	8.83	10
SPORT BOAT	I	HISPANO-SUIZA	150	1530	2500	970	600	350	250	126	42	73	70	65	58	11	26	76	7.85	16.65

AERIAL PHOTOGRAPHY AS APPLIED TO TOPOGRAPHICAL SURVEYS

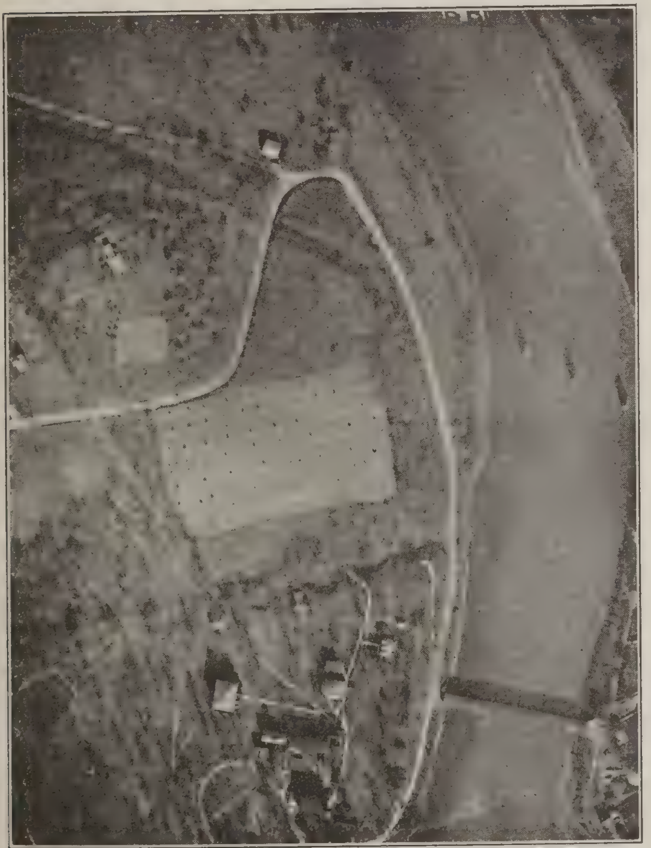
By J. B. MANDEVILLE, Chief Engineer of the F. W. Phillips Gas & Oil Company

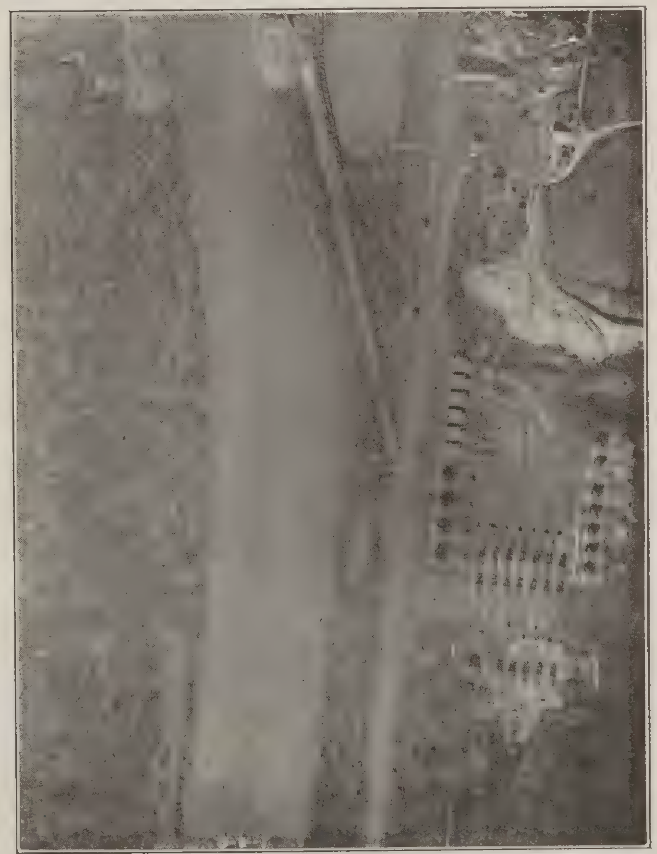
FOR the last eight years the writer has been partially occupied in overseeing extensive topographical surveys in Western Pennsylvania, these surveys covering all important features of the terrain with the exception of contours which are not a necessity on these particular surveys. In the last two years the cost of such surveys has increased from two to four times, making the price of them almost prohibitive. Last summer the writer, after a great deal of study, decided that aerial photography was the method that should be used to obtain all basic surveys. A contract was therefore made for a mosaic covering about six hundred square miles and which gave the use of a ship, the services of a pilot, a photographic observer and a mechanic. The job started under very unfavorable conditions, due to the extraordinary weather that prevailed in this section last fall. To be brief, we had only three days flying weather in over ten weeks, and those days at widely separated intervals. Some results were obtained and I have now in my possession an aerial map of about twenty-five square miles, which is very satisfactory and proves conclusively that this method will eventually be a great success.

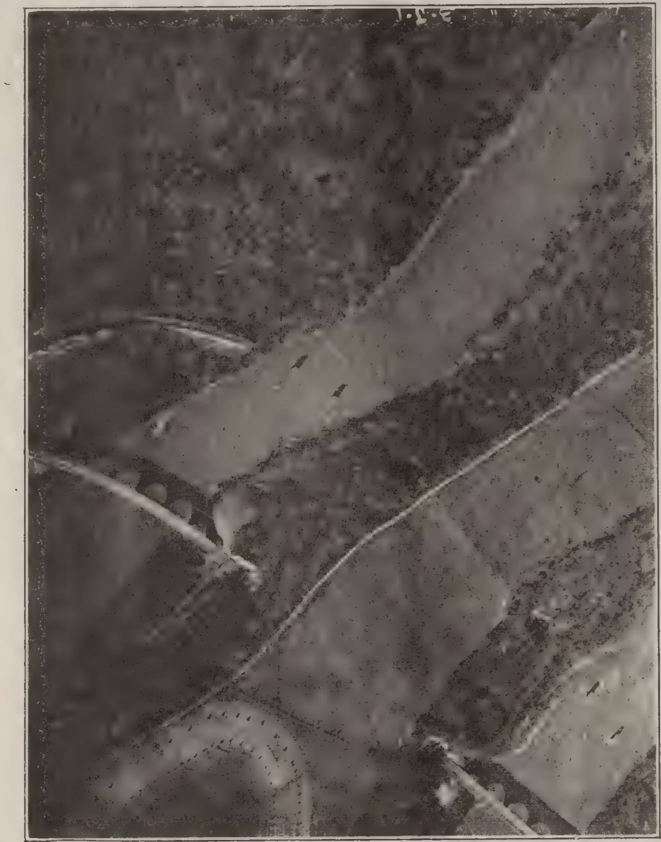

Portion of terrain. Note public road through woods. Also corn shocks in fields, orchard, farm house and buildings

The equipment used was a Curtiss JN 4 and a Graflex 4 x 5 manually operated plate camera. The flying height was five thousand feet, which with this camera gave a scale on the map of about five hundred feet per inch. The equipment is not altogether satisfactory and I am planning a radical change for the coming summer, both in regard to the ship and the photographic apparatus. Another difficulty experienced was in controlling the ship to get the proper overlap on the photographs without making a great many retakes or overlapping plates. The writer has worked out a method that will overcome this, at the same time avoiding idle flying to a great extent.

The writer is satisfied that he will reduce the cost of his basic surveys from twenty-five to forty per cent. The item of cost, however, is not the sole consideration as speed is also of great importance. This point is where the aerial method of surveying demonstrates its usefulness, as it will cut down the time necessary to cover a certain terrain from


Shows a boarding school. Note covered bridge in foreground, with class numerals painted on roof. School about 150 feet above river. Corn shocks in field in center of picture. Also public road winding around the hill


Small coal operation. Note tipple, mine tracks, dump, etc., in upper right hand corner. Note empty coal cars on siding. Also paths in rear of dwelling houses



A very curious aerial photograph. The two stone arch bridges. The railway track entering and leaving the tunnel, which is the new high line. The old low grade, and bridge piers from which the bridges and tracks have been removed. Also note the old tunnel portals. The open space shown between the opposite ends of the tunnel is an open field on top of the tunnel hill and is about one hundred and fifty feet above the river shown in the picture. Both rivers, by the way, are the same, the railway cutting across the loop by means of the tunnel

months to weeks and sometimes to days. A base map of this kind has also another advantage which might not be apparent at first sight. All engineers know how impossible it is to make extended notes and surveys and then not plot them up and use them immediately. With the photographs it is different, as they would be just as useful in two or three years as they would be on the day they were taken. Also, isolated pieces of terrain can be mapped and the correct relation of the various pieces can be maintained without difficulty.

There are various other features of this class of surveys that make them very desirable, i. e., all features that are on the ground are available for use, when thoroughly studied on the map. This makes such surveys much more complete than any instrument survey and shows various features that a survey crew would never be able to get, regardless of the time spent or the amount of money used. The survey is absolutely accurate also. This does away with the discovery that the original survey contained a mistake, and with the sending out of a checking party or perhaps a second checking party to be sure that the previous surveys were correct. All engineers have experienced this highly disagreeable phase of the profession and will readily agree that this is expensive business and a source of much annoyance and bad feeling. The accuracy of a map made by this method where the terrain is badly broken by hills is very close. As nearly as I can check it so far, the error "seems" to run a little less than one in two-hundred. I say "seems" as I believe it runs much less than this, the belief being based upon the method used in checking and the uniformity of the difference obtained between the instrument surveys and the aerial surveys.

(*Continued from page* 80)

has reached a point of development which it could not have obtained by years of normal peaceful achievement.

"Of this development full advantage should be taken so that the investment so made is not lost. In this direction, with the coming of peace, our own company have devoted their energies in the research department to the perfecting of an airplane with less weight per horsepower, but still a high speed of travel.

"The type of machine which we now have flying is a useful weight of 3,500 to 3,600 pounds, apart from petrol and oil or crude, a speed of 115 miles per hour and a non-stop flying capacity of 500 to 600 miles. With the later improvements that we now see possible, we expect to reduce the horsepower required for this performance to 300, with a corresponding decrease in cost of operation. The same advantage, too, can be gained in small machines, and we can visualize a small machine of 25 horsepower capable of carrying pilot and passenger at a speed of 100 to 110 miles per hour for a non-stop distance of 400 to 500 miles. If we now look back along the whole long-drawn-out history of the world's economic development, can we not at this moment feel that we stand at a new point of development in the world's history and that the airplane developed as it is today improves still further as it will tomorrow, points the finger post along the line of commercial development and shows us the instrument to hand for future development. The instrument is in our hand—the airplane—but it is of no use without those secondary adjuncts to a service that makes schedule timekeeping a certainty. The provision of flying fields and emergency landing grounds along an air route, the setting up of weather bureaus with a good staff of men able to forecast the weather, the provision of wireless communications so that information is readily obtained, all is essential if the air route is to be organized and satisfactorily maintained.

"In Europe this work was a necessity for satisfactory military operation. Great attention was devoted to it at the front and along the air routes leading to it. Of this development, we, in England, have been able to take advantage and with the ground work available and large machines converted from war purposes to those of peace, it was easy to start services. The results have been very satisfactory."

"Although we have been operating only during the winter months, for flying outside England was not permitted before September 1, 1919, we have flown no less than 82,428 miles, have carried 4,201 passengers and 49,467 pounds of freight without injury to a single passenger or loss of a pound of freight, a record which can surely challenge any other means of transportation. I understand that in this city alone over 1,500 people lost their lives in automobile accidents on the streets. These records show what can be done even with a new improvised service organized quickly on the coming of peace.

"The influence of air transport is going to be enormous in the world's development. To a great country such as the United States of America, where towns are separated by great distances, the airplane will act like a gigantic hand and squeeze these towns and cities close together. Distances are measured by mankind by the time which it takes to go from one place to another. The distance of 1,000 miles or so from New York to Chicago means nothing to the business man. He knows only of the 20 hours in the train. By air, in 7 or 8 hours, or less, with a following wind, Chicago moves closer to New York and is no further away from the point of view of time in the air than Syracuse is on the railroad today. In the years to come London will be as close to New York as Edinboro was from London one hundred years ago.

"Commerce in America has been so speeded up that new methods are now required to take full advantage of the work that has to be done. The airplane provides the means for which we all look. In Europe it has been taken advantage of by commercial travelers desirous of concluding quick deals and by export and import houses requiring the quick delivery of goods. Especially has it been patronized by those who desire to send across valuable pictures or china, as there is less chance of these being broken by travel in air than by the rough handling which has been the case on the railroad and steamship services of Great Britain since the war.

"If I have spoken of the development only on this side and left over the great flights which have been made here, such as the continual service between Washington and New York, the flights of Colonel Harts on the Martin Bomber around the Rim, Mr. Lawson's great flight on the Lawson air liner, Commander Reade's great work with the NC-4 as well as the work all over the country of Curtis machines and many others, if I have not referred to these, it is only because being a stranger to this country, I have touched more fully on the work done on the other side, because with it I am more acquainted.

"The field for development is great, the energy and enterprises requisite to its latest development of the world's trade is one of the characteristics of this country and there is only one motto which I will give you in the words of your great American poet:

"Let us then be up and doing
With a heart for any fate,
Still achieving, still pursuing,
Learn to labor and to wait."

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committees find it hard to make an adequate report of the situation in less than two hundred printed pages. AERIAL AGE *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigation Committee summarized in AERIAL AGE *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

The DH-4 and Its 3,600 Changes

Testimony before the committee showed that 789 changes were ordered in the construction of the Bristol, which was a reckless attempt to fit a foreign machine to the heavy Liberty motor in which all our interests were pooled (p. 3450). After wasting $6,000,000, according to the Thomas Senate committee report, the Bristol was discarded early in 1918. According to the Hughes report, subject to salvage, $17,500,000 was wasted on 1,600 S.J.-1 training planes. About $50,000,000 was spent for 4,000 "utterly dangerous" DH-4s during the war. This accounts for nearly $75,000,000 largely wasted on three useless experimental planes.

No question exists but that the Liberty motor, when fully developed in 1918, could be used for bombing and observation planes, but for fighting planes it was entirely unfitted.

The claim that approximately 3,600 changes were made in the DH-4 observation plane during its development and that engine experimental development was equally difficult and involved, gives full significance to the danger of pooling all interests in experimenting on one air machine or on one engine for all air machines.

Apart from DH-4's, the record of aeroplane production, good, bad and indifferent, none of which were fighting planes, reached a total of 6,342 during the 10 months of 1918, when the country supposed production was five times that number of fighting machines. What is more remarkable, the first five months' total of 3,729 dropped to 2,613, or about a 30 per cent loss during the last five months of war (p. 518).

Wasted Public Funds

A brief examination of the Hughes and Thomas hearings, covering an aggregate of probably 20,000 typewritten pages of testimony, discloses great waste of time and money accompanying many activities of aircraft production. Evidence of waste and of glaring mismanagement and inefficiency set forth in the Hughes and Thomas reports are found in this committee's hearings, but will not again be recited at length. Although reckless expenditures reached a large part of the great total appropriation made for aircraft by Congress, it is wasted time to mourn for water that has gone over the wheel.

Fabulous amounts were expended or contracted for castor oil, used as a lubricant, acetone used for dope, spruce used for wing beams, and for various other things that went into aeroplane construction.

A statement covering the operations of either branch of production necessarily reaches beyond the limits of any report that will be read or digested by the House. Justice Hughes, however, said in his report:

> In particular it is recommended that the activities in relation to spruce production, which being largely centered on the Pacific coast, it was impracticable to embrace in the present inquiry, should be carefully scrutinized (p. 3806).

Spruce Production Record

The Committee of Fifteen, of which the aviation subcommittee is a part, by unanimous vote directed that the Spruce Production investigation be undertaken and, pursuant to that vote, hearings were held by us on the Pacific coast, where spruce activities were centered. Several investigations had previously occurred and reports rendered to the War Department, including the Stansbury report and Maj. Howes' report, the latter being based on extended examination covering 40 pages of committee hearings, which investigation was conducted by Lieut. Kerrigan and a number of military operators in the employ of the Inspector General's Department (pp. 2342-2384). Kerrigan, a former member of the San Francisco police department, seemed to be fearless and thorough in his work.

Maj. Howes sent a telegram dated November 23, 1918, to the Intelligence Department, Washington (p. 97). A brief extract is submitted:

> Lumbermen of the Northwest unanimous in demanding Federal investigation of lumber situation. Their principal contentions are: That John D. Ryan was director Milwaukee Railroad; that he was instrumental in giving cost-plus contracts Siems-Carey-Kerbaugh corporation for building railroad across Washington peninsula which tapped holdings of the Lacey interest and the Milwaukee Land Co.; that Sawyer, former chief engineer of the Milwaukee Railroad, was made major in Spruce Production Division and is building the road which joins the Milwaukee at Joyce, Wash.
>
> Ryan approved the lending of $6,000,000 to the Siems-Carey-Kerbaugh corporation and the copy of the mortgage is on file in Clallam County, Wash., approved by Assistant Secretary of War Crowell. This road according to Kerbaugh has cost about $12,000,000 and taps no spruce until it travels over 40 miles, which brings it into the holdings of Laceys and the Milwaukee Land Co.

Secretary Baker's Representative Investigates

Capt. Gund, an attorney of Cleveland, Ohio, and Maj. Martin Ray of the Inspector General's Department, were sent by Secretary Baker to investigate the charges of Maj. Howes.

On December 28, 1918, after a personal investigation, Gund sent the following telegram to the War Department, Washington (p. 3445):

> Have unearthed evidence indicating enormous graft, but do not consider case as yet ready for submission to legal prosecution. I deem it absolutely essential in obtaining connecting evidence to unearth contents of private offices. Doubt any present authority to act. I am proceeding with investigation as rapidly as possible pending your explicit confirmation which I again repeat is absolutely essential. (Signed) Gund.

Lieut. Kerrigan's supplemental report (pp. 3444-3448) states that on December 18, 10 days prior to Gund's telegram, he was called before Maj. Ray and "placed under oath, warned that anything I might say could be used against me." Kerrigan says he was not further consulted, although he had accumulated much data and in view of Ray's attitude he did not offer further information (p. 2342-2384). Gund on his own initiative learned of matters on which his telegram was based. Gund suddenly left for San Francisco and did not return and Maj. Ray, who is alleged to have announced on December 18 that Kerrigan had nothing but "the statements of a few Seattle lumbermen," was left in charge to conduct the investigation (p. 3444).

Major Ray Investigates His Superiors

Maj. Ray did not examine into important matters contained in Kerrigan's report (pp. 2342-2384 and 3447-3448), and this committee did not learn of the voluminous Kerrigan reports until after leaving Seattle and Portland. Any sincere, effective and conclusive investigation should have been conducted with the aid of Kerrigan and Howes, and at a time when witnesses and facts were easily available, unless the purpose was to shield those under suspicion. As the charges included the Director of Aircraft, an ex-governor, and various superior military officers, the conclusion is certain that a major selected to investigate his superiors was placed in a difficult, if not absurd position, and this fact may explain conclusions which differed from those of Capt. Gund, Maj. Howes, an officer of equal rank, and Kerrigan, all of whom were promptly relieved from Portland duties.

Ray's exoneration of all parties was according to form, and Secretary Baker thereafter asked Maj. Gen. McIntyre, of the General Staff, to pass upon the Ray report. In the opinion filed by Gen. McIntyre, the following significant statement appears, regarding the railway referred to by Maj. Howes (p. 837):

> A possible congressional investigation with reference to the location of this railroad might prove embarrassing to the War Department, as the plain insinuation would be made that the decision was influenced by the large financial interests concerned.

When your committee reached the coast, important witnesses were found scattered and could not be located, and the investigation was practically confined to Col. Disque's management of spruce production, the results accomplished in view of what ought to have been done, and to a few specific charges, including those made by Maj. Howes against Director John D. Ryan.

Nearly Fifty Million Dollars for Spruce

As stated before, total expenditures and commitments for aircraft reached about $1,051,000,000. Of this amount $48,762,826 were expended for "spruce" production, to be allotted to the several governments as hereinafter set forth (p. 2857).

This committee was fortunate early in its hearings to secure attendance of two witnesses—Frank R. Pendleton, of Everett, Wash., and George H. Kelly, of Portland, Ore., two leading lumbermen of the Northwest, one of whom was given the superintendency of spruce production in Canada, acting for the British Government, and the other was given charge of American lumber operations in France. These two men, in widely different fields, gave a demonstration of lumber production under extreme difficulties, important to understand, in comparison with American operations.

Pendleton, who lives at Everett, near Seattle, Wash., had a desire to place his abilities to good use, and volunteered about January, 1918, without compensation, to aid Canadian spruce operations (p. 1255). He was placed in charge of the entire Canadian work early in 1918 and began producing finished spruce aeroplane material in April and May of that year.

Pendleton's Canadian Spruce Operations

The best spruce timber suitable for aeroplanes in Canada was found growing on Queen Charlotte Island, 500 miles distant from Vancouver, B. C. (p. 1251). Pendleton secured the co-operation of all the private logging and lumbering interests and without any financing by the Government. Logging was started on the islands and the logs rafted to the mainland, a distance of 100 to 175 miles, and from there, when cut up, the lumber was transported 300 miles beyond to Vancouver, B. C., for shipment and thence to Europe (p. 1253).

The rafting was across "the roughest water" on the Canadian coast and occurred with practically no loss in rafts. No soldiers or other outside aid were brought in; no outside financial help was given; no expensive logging roads were built; but, by co-ordinating available agencies, Pendleton had produced, when the armistice was signed, 26,500,000 feet of finished aeroplane lumber (p. 1261). Eight million feet of this was produced in November, 1918, or at the rate of nearly 100,000,000 feet of finished aeroplane lumber per year in an industry built up within about seven or eight months. Over 200,000,00 feet of logs were cut to get the 26,500,000 feet, which shows the extent of operations (p. 1253). At the rate of 2,000 feet per aeroplane—the Curtiss training plane takes only 600 feet and the Spad fighting plane 800 feet—enough spruce was being produced in November, 1918, in Canada alone, to make 4,000 planes, or more than double all the British fighting planes then at the front and nearly 20 times the number of American-built planes that reached the front in 19 months of war. At the same November rate, Pendleton in Canada could have furnished sufficient spruce for about 50,000 planes in one year, or several times the total number at the front belonging to all the Allies.

Quality of Canadian and American Spruce Lumber

Director of American Aviation John D. Ryan, in seeking to bolster up the pitiable American operations, said that American finished aeroplane lumber was better than the Canadian (p. 3100).

Pendleton, an American, who served Canada free and received high praise for his war work, replied (p. 3164-5) that Canadian spruce lumber was "far superior" to any other. And then Pendleton describes "wasteful methods and awful loss" resulting from inexperience in American spruce operations, which he frankly discussed (p. 3164).

In this opinion Pendleton is confirmed by Dant, a leading lumber exporter of this country, who had handled great quantities of American spruce lumber and who quoted the French representative, Capt. Holland (p. 2261), to the effect that 85 per cent of the American product was wasted in Disque's earlier operations by improper cutting, practically the same reasons as given by Pendleton.

Your committee has not attempted to determine the relative quality of American and Canadian spruce lumber, but believes from the testimony that Canadian production, under the direction of an experienced American lumberman, would not suffer by comparison with that of an admittedly green novice at Portland. It was not disputed in all the hearings that the great logging interests of Puget Sound, Grays Harbor, Columbia River, and of Oregon, together with over 400 private sawmills, had a capacity of 9,000,000,000 feet of lumber annually. The total cut of Canadian lumbering operations reached about 800,000,000 feet annually, or only about 10 per cent of American lumbering facilities.

These figures are important to remember when drawing comparisons with America's comparatively small aeroplane lumber production. The Canadian experience is cited to show what could have been accomplished in this country in 1918 with ordinary facilities directed and undertaken by existing lumbering agencies.

That Canada's spruce production was not unusual is evidenced by America's lumbering operations in France under the direction of Col. George H. Kelly, of Portland, Ore. Portland, by a coincidence, was the headquarters of American spruce production.

American Lumbering in France

At the beginning of the war the Lumbermen's Association of the Pacific coast recommended Col. Kelly for American forestry work in France. He was one of scores of successful lumbermen of the coast and he was given charge of all American lumbering operations overseas (p. 2309). Within 11 days after landing in France, Kelly traveled from Brest to Landes, erected a sawmill in the wilderness and was logging and sawing lumber (p. 2309). With American soldier labor, working 10-hour shifts at enlisted men's pay of $30 a month, a minimum fixed by Congress, Col. Kelly worked his men at times in 6 feet of snow with the thermometer sometimes below zero in the Vosges mountains, where large operations occurred (p. 2315).

He built camps and mills and, beginning from nothing, by October, 1918, or within one year (p. 2309), Col. Kelly was sawing 50,000,000 feet of lumber per month, used for all purposes, including spruce for aeroplanes (p. 2310). From one mill, at the start, he built 81 small mills, and guaranteed to deliver a monthly production of 100,000,000 feet of sawed lumber by February, 1919. What Col. Kelly promised to do he accomplished, because he was a practical man, like Pendleton in Canada, and understood the business. Great Britain and France were also conducting lumbering operations in France in districts assigned to each. Some of Col. Kelly's officers were killed by enemy fire while milling "right at the front" (p. 2317), but the soldiers were enthusiastic over their work through encouragement given and by force of example of Col. Kelly and those in command.

The record of two practical American lumbermen in Canada and France shows what might have been done by us—but wasn't.

Bearing on this same matter of airplane lumber, probably no testimony submitted on the subject was more significant than that of witness Edward K. Butler, a large manufacturer of Syracuse, N. Y., who was manufacturing experimental laminated wing beams for the Allies in 1915 and 1916, before our entrance into the war.

Mr. Butler demonstrated to the War Department experts that he could manufacture laminated wing beams out of small strips which passed the highest tests of the Forestry Department experts at Madison, Wis. (p. 2574). With slight encouragement he persisted in his offers to the Government until near the end of the war when he was promised an order for a thousand wing beams. These he agreed to furnish "at $25 apiece, or any price they wanted to pay" (p. 2578). This price was nominal compared with our wasteful spruce operations.

The witness testified that he could unquestionably have turned out 4,000 or 5,000 feet a day, or 250 beams a day, or enough for 1,500 aeroplanes a month, or presumably double that number with extra shifts in his factory (p. 2582). Enough spruce from the Adirondacks alone could have been furnished to keep his factory running (p. 2583).

Mr. Butler stated that his formula for laminating was not secret, and that he would have been glad to have given access to his factory to anyone if the Government had been sufficiently interested (p. 2583).

Of equal importance was the statement of American aviators that the German Fokker machine, which outclassed all of the Allies' planes, was built with a tough steel frame welded together, wings without brace wires (p. 3627). If Germany could develop a steel frame for practical use in a high-type plane, it is a mystery why our own Government could not have used the same logical substitute for wood wing beams.

(To Be Continued)

NAVAL and MILITARY AERONAUTICS

Flying Status of Air Officers

Orders No. 6 from the office of the Director of Army Air Service enunciate policies in connection with the flying status of both flying and non-flying officers, and of officers of other services who have been detailed or attached to the Air Service for flight duty or otherwise. Flying officers, within the meaning of the order, are: (*a*) All Air Service officers who have been, or may hereafter be, announced in orders as having received an authorized flying rating; (*b*) Air Service officers who are undergoing an authorized course of flying instruction for the purpose of acquiring a flying rating; (*c*) officers of other services who have been detailed or attached to the Air Service for flight duty. Non-flying officers are: All officers of the Air Service, or officers attached or detailed to the Air Service, not specifically included in the foregoing specification of flying officers. "Flying status" is defined as that status peculiar to officers who have been assigned to duty "requiring them to participate in regular and frequent aerial flights" as contemplated in Paragraph 1269½ Army Regulations, 1913. Flying ratings will be granted only at designated schools after completion of a specified course of training.

Assigned to Balloon School

Col. William N. Hensley, Jr., air service, has been assigned to the command of the Army Balloon School, Lee Hall, Va.

Aviator Opens Boarding School

Captain Merian Cooper, of Minneapolis, an American aviator attached to the Kosciuszko Squadron of the Polish Army, has established a boarding school for Polish war orphans in Lwow, Galicia. The school is supported by the squadron and operated under the supervision of the American Red Cross.

The students of the school are all orphans, sons of soldiers of Poland who fell in the service of their country.

Lieut. Arthur E. Easterbrook Transferred to Infantry

Word has been received that Lieut. Arthur Easterbrook has been transferred from the Air Service back to the Infantry. He has been on duty with the 1st Surveillance Group, 104th Squadron at El Paso, Texas, as Group Operations officer.

Lieut. Easterbrook has an enviable overseas record, being officially credited with five German planes. He was awarded the Distinguished Service Cross and the Croix de Guerre, and also recently an Oak Leaf Cluster.

Colonel Tompkins Leaves Fort Bliss with Aero Escort

Colonel S. R. H. Tompkins, former commanding officer for the 7th Cavalry stationed at Fort Bliss, left there recently to take up his new duties as commanding officer of the 12th Cavalry at Brownsville, Texas. Colonel Tompkins has been connected with the 7th Cavalry for 34 years and was a hearty supporter of the Air Service. To demonstrate their appreciation of the many kind and noteworthy things he did for the Air Service in the past, the 12th and 104th Squadron flew a formation of aeroplanes as an escort to the train which carried Colonel Tompkins away from El Paso. The formation escorted the train as far as Clint and while it was stopped at Clint, the planes dropped a message to the Colonel extending the greetings of the officers and men of the First Surveillance Group, and their wishes for his success in his new command.

To Coördinate Helium Gas Activities

A joint Army-Navy Board has been created by the Secretary of War and the Secretary of the Navy for the purpose of coördinating the various helium gas activities. Because of the fact that so many of the problems in connection with helium gas concerns the Department of the Interior, the Bureau of Mines of that Department has been invited to have a representative meet with that board.

Col. Hensley Tells of German Dirigible

Commercial airships are plying regularly between Berlin and Stockholm, and Berlin and Berne, according to Col. William Hensley, Jr., U. S. A., who arrived recently from Antwerp. Colonel Hensley is the American officer who accompanied the British dirigible R-34 on its return flight to England last summer.

Colonel Hensley, who went to Germany to study the Zeppelin type of dirigible balloon, said that the dirigible was the thing of the future, that traveling in them was very comfortable and a passenger did not suffer from the vibration or the roll and pitch of a sea vessel. He pointed out that the Germans have carried 140,000 passengers on the Stockholm trips without an accident. He said that dirigibles were more essential than steamboats, and that with this kind of airship it would be possible for a man to leave Chicago or St. Louis in the afternoon and get to Cuba the next day.

Policy of the Army and Navy Relating to Aircraft

The following policy of the Army and Navy relating to aircraft has been approved by the Aeronautical Board, the Secretary of War and the Secretary of the Navy and is published for the information and guidance of all concerned:

Aircraft to be used in the operations of war will be designated.

(a) Army aircraft.
(b) Navy aircraft.
(c) Marine aircraft.

Army aircraft are those provided by the War Department and manned by Army personnel.

Navy aircraft are those provided by the Navy Department and manned by Navy personnel.

Marine aircraft are those provided by the Navy Department and manned by Marine Corps personnel.

U. S. Navy to Build Record Dirigible

Following the announcement that the Navy Department intends to build two great flying boats to have nine motors each, and to be much larger than the NC-4, which flew the Atlantic, comes word that the navy also is to build the biggest and fastest dirigible in the world.

This ship is to surpass in size and power the R-34, the British dirigible which flew from England to New York and back last summer. Ground work already had been started for the hangar, which is to be at Lakehurst, L. I. The dirigible is to be made in sections at Philadelphia and shipped to Lakehurst for assembly.

At the Nebraska Aircraft Corp. Flying Field. Marjorie Keene, instructor, Florence Jones, daughter of the Vice-President of the Nebraska Aircraft Corp., and Pilot Sealer

FOREIGN NEWS

$500,000,000 British Aero Supplies Sold to Syndicate.

London.—The British government has sold to a syndicate aeroplanes and material to the value of $500,000,000. The purchase includes the entire surplus aircraft material in Great Britain, consisiting of 10,000 aeroplanes, 30,000 new aeroplane engines and an immense quantity of engine and aeroplane spares and hangars.

Aerial Mail Service Regular in Italy.

Rome.—The aerial mail service begun here during recent railway and postal strikes has proved such a success that the Government is making it permanent, charging an extra 6 cents fee for each letter up to 15 grammes. Airships and small aeroplanes now ply regularly with mails and parcels between Rome and Milan, Rome and Pisa, Naples and Foggia.

The Ministry of Transportation is having a friction with the Ministry of Posts, which sees through bureaucratic spectacles and is averse to modern methods. The latter Ministry actually refused to accept mails brought to Rome by one aeroplane because the list of mail-bags had been made out by the pilot, who is not an authorized post official.

All official correspondence, the mail of Deputies and of large business firms is going by aeroplane now, in spite of protests from the Ministry of Posts.

Rome-Tokio Flight

The Rome-Tokio flight was organized by the Italian State Aeronautics in October, 1919. Gabriele D'Annunzio had been destined to command the planes taking part in it, but as he has been detained in Fiume since September 12, 1919, he could not lead the machines in this flight.

This performance must be completed by an entire Squadron, which fact has rendered the organization of the Supply Stations more difficult.

In order to establish these supply stations along the route, several Missions left Italy last October for this purpose. These depots, besides having gasoline have also available oil and spare parts for the aeroplanes and motors.

The itinerary commences in Rome and from this place to Bagdad, the route is different from the Oriental English route. From Bagdad to Bangkok the route is the same. From Bangkok the aeroplanes must fly north until they reach Peking, and then they must cross the Yellow Sea to Osaka and Tokio.

The following stops have been anticipated: Rome, Gioia del Colle, Saloniki, Adalia, Aleppo, Bagdad, Busrah, Bender Abbas, Charbor, Karachi, Delhi, Benares, Calcutta, Rangoon, Bangkok, Hani, Canton, Foochoo, Shanghai, Kiauchau, Peking, Chefu, Fusan, Osaka, Tokio.

The total mileage is 10,099 miles corresponding to 16,252 Km.

The machines scheduled to make the flight are two Caproni Triplanes and six two-seater S.V.A.

The first planes leaving Rome were the two Caproni Triplanes, which hopped off on February 2nd last. They were being piloted by Lts. Sala, Borello, Negrini and Origgi.

Peru Develops Aviation

Washington.—The President of Peru has published a decree creating a school of military aviation in Peru, and twelve French planes were received in Lima about a month ago. Representatives of both English and American companies are in Lima at the present time, and the purchase of two American planes has already been made by the employees of the Empresas Electricas Asociadas, who seem to have taken the intiative in promoting aeronautics.

It is also reported that the Peruvian Corporation intends to inaugurate a flying boat service between Callao and the summer resort of Ancon, twenty-five miles to the north. Planes manufactured by Handley Page are to be used for this service. Flights will also be made between Callao and Salaverry, a distance of 260 nautical miles, by steamer route, which the flying boats can cover in approximately three hours. It is expected that considerable traffic between Callao and outlying ports will develop.

Swiss-German Aerial Traffic

An agreement for regulating aerial traffic between Switzerland and Germany has been proposed by the latter, and the Swiss Government is reported to have expressed willingness to begin negotiations.

The Monaco Meeting

The competitors entered for the Monaco meeting are the following:

1. Donnet (flying boat, type D-10, biplane, two Hispano-Suiza engines).
2. Donnet (flying boat, type D-10, biplane, two Hispano-Suiza engines).
3. Caudron (seaplane, type C-37, biplane, two Rhône engines).
4. Caudron (seaplane, type C-37, biplane, two Rhône engines).
5. Nieuport (flying boat, biplane, Sunbeam engine).
6. Caudron (seaplane, type C-39, biplane, Rhône engine).
7. Bréguet (seaplane, type 18, biplane, Bréguet-Bugatti engine).
8. Fairey (seaplane, type C-111, biplane, Napier engine).
9. Savoia (flying boat, type S-12, biplane, San Giorgo engine).
10. Savoia (flying boat, type S-12, biplane, San Giorgo engine).

Trials of Speed and Height

1. Donnet (flying boat, type D-10, biplane, two Hispano-Suiza engines).
2. Donnet (flying boat, type D-10, biplane, two Hispano-Suiza engines.
3. Caudron (seaplane, type C-37, biplane, two Rhône engines).
4. Caudron (seaplane, type C-37, biplane, two Rhône engines).
5. Nieuport (seaplane, two floats, biplane, one Hispano-Suiza engine).
6. Nieuport (seaplane, two floats, biplane, one Hispano-Suiza engine).
7. Caudron (seaplane, type C-39, biplane, two Rhône engines).
8. Bréguet (seaplane, central float type 18, biplane, one Bréguet-Bugatti engine).
9. Fairey (seaplane, two floats, type C-111, biplane, one Napier engine).
10. Savoia (flying boat, type S-17, biplane, one San Giorgio engine).

An Italian-Grecian Aerial Mail

Negotiations have been opened between the Italian and Grecian Governments, with a view to establishing an aerial mail between the two countries, under the regulations of the convention recently agreed upon by Italy and Greece. The Italian aerodrome will be at Brindisi and the other terminus will be at Corfu.

New Zealand Aerial Mail Service

An experimental seaplane mail service is to be started between Auckland and provincial seaports, reports *The Times* correspondent at Wellington. If the service is successful it will be extended to remote districts.

The Rome-Athens Aerial Mail Service

The service is reported to be going to start very shortly. Preparations and organizing have been going on some months. It seems that the mail service, as at present working, leaves so much to be desired that even an indifferent aerial one would cause general rejoicing. With the Savoia Company's flying boats going as strong as they are, the mail service should become a godsend to Italo-Greek commercial relations.

Swedish-Finnish Aerial Mails

From information published by the *Dagens Nyheder,* it appears that the regular air service between Helsingfors and Stockholm will begin in May next, one aeroplane flying from Helsingfors every day, carrying two or three passengers and 300 kilograms of mail.

Hold S. A. E. Meeting in Pittsburgh

About fifty members of the Pennsylvania section of the Society of Automotive Engineers held their regular monthly meeting at Pittsburgh recently. During the morning a trip of inspection to the Braeburn Steel Company's plant at Braeburn, Pa., was made.

After the return to Pittsburgh, a professional session was held in the afternoon at the Pittsburgh Chamber of Commerce. J. M. Schoonmaker of Pittsburgh, who was formerly connected with the Dayton-Wright Aeroplane Company gave an instructive talk, illustrated with moving pictures, on aeroplane quantity production at Dayton during the war.

In view of the large number of automotive engineers now located in the Pittsburgh district, the formation of a Pittsburgh or Western Pennsylvania Division of the Pennsylvania Section of the S. A. E. is now being considered.

An Avignon-Nice Air Service

The Compagnie Aërienne Française have organized an aeroplane service between Avignon and Nice. The machine will carry two passengers and will leave the aerodromes as soon as the required passengers arrive. Priority will be given to those who take their tickets in advance.

The departures of the aeroplanes from Avignon will be in connection with the arrivals there of the three "rapide" trains from Paris. By travelling from Avignon to Nice or vice versa by air nearly eight hours will be saved over the time taken by the "rapides."

The time of departure of the aeroplanes from Nice will be changed as the days lengthen. For the present month the machines will leave Nice at 15h.00 and are due at Avignon at 17h.10. The passengers can dine there and proceed to Paris by either of three trains which leave Avignon *circa* 20h. 30 o'clock.

The fare is 500 francs per person for two passengers or 1,000 francs if only one person is carried.

Smaller and Cheaper Aeroplanes

Lecturing on "Aviation and the Possibilities That Await the Development of the Aeroplane," Mr. F. Handley Page pointed out that during the war economy in the cost of running played no part in the design. Their experiments had been directed to finding out whether it would not be possible to fly with smaller planes, and one of their interesting discoveries indicated that we should be able to use planes of at least half the size of the present area. Experiments showed that they would be able to land slower with these smaller machines and that with 25 h.p. instead of 100 h.p. they would be able to fly with pilot and passenger, and with enough petrol and oil for five hours at a speed of 100 to 110 miles an hour.

"We shall be able to get a small machine that you can put perhaps in the coal-shed, and drag it out on a fine Saturday afternoon for a trip to any destination within a range of 500 miles at a cost no greater than that of running a small motor car."

The price of flying from London to Paris will be comparable in the future with travelling by omnibus, though it will be a long time ahead yet, as at present we have only the old type of machines. Development, however, would be along the cheaper lines he had indicated.

"With the enormous production of motor-cars here and in America and other places, the day is not far distant when it will be impossible to move along the roads; and there will be only one thing left to do if you want to go anywhere, and that is to travel by air."

Progress of French Naval Air Service

In 1914 the French Navy possessed eight aeroplanes or seaplanes. At the armistice this number had increased to 1,264.. At the beginning of the war there were few squadrons or centres in existence, but five years later there were 19 aviation centres in France, nine in the Colonies, and eight on foreign territory.

The personnel increased in a similar manner.

	Pilots.	Observers.	Total including other ranks.
On Aug. 1, 1914..........	32	...	208
On Jan. 1, 1918..........	361	470	4,626
On Nov. 11, 1918..........	702	693	6,740

In regard to lighter-than-air machines the Navy in 1916 had five airships and no kite-balloons. By the armistice there were in the marine service 37 airships, 200 kite balloons, 12 airship centres, 18 kite-balloon centres, 144 airship pilots and 233 kite-balloon observers.

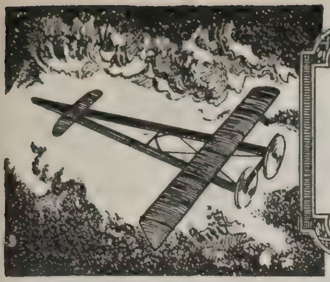
During the war 155 submarines were attacked by the aerial arm, 124 by seaplane and 31 by airships. Between October, 1917, and October, 1918, the naval aeroplanes covered 3,721,670 nautical miles, and the naval kite-balloons carried out 29,295 hours of flight.

Spanish Invention to Determine Position

A Spanish inventor has devised an instrument which he claims will enable anyone unskilled in navigtation to determine his latitude and longitude to within a mile without taking any observations of heavenly bodies. The principle of it is the use of two gyroscopes.

New French Military Aeronautics Chief

General Dumesnil, who has been appointed Director of Military Aeronautics in France, was originally an artillery officer. He held several important positions during the war, and was promoted to command a brigade in March, 1918.



ELEMENTARY AERONAUTICS
and
MODEL NOTES
By John F. McMahon

Scale Model of the Handley-Page

The model described in this issue is of the type known as the scale model, or a miniature of a large machine.

The racing model is generally known as the flying stick because it is built light and a large machine could not be patterned after one and be a successful flyer as a scale model.

Now the scale model seems to be troublesome to most model flyers who like to believe that this type of model is not worth the trouble to build. Some say they will not fly as far, which is correct, but if anything is to be learned from flying models, it will not be from the flying stick type. True, the latter has its good points, namely to give the model builder an idea of correct balance, etc.

The scale model, however, behaves, resembles and requires the same careful study in design that the large one does. Does this not warrant the model builders spending more time in developing and building scale models?

During the show week many model aeroplane enthusiasts from other cities met the writer and discussed matter that would help model aeroplane building in this country. One of these young men, a member of the Ithaca Model Aero Club and an employe of the Thomas Aeroplane Co. of that city, informed me that most of the members of his club were working on scale models, and a drawing of the one he is working on showed the careful study these young men are devoting to model aeroplanes.

They intend holding an exposition for model aeroplanes, to be held some time in April, the place to be decided on later when all details will be published.

As the space is limited, all the details pertaining to the construction of this model cannot be shown, but the reader can get a fair idea of the general construction. If these are not large enough, large blue prints can be purchased from the Wading River Co., one of our advertisers, as their model resembles this one to a certain extent.

Fuselage

The fuselage is built up from ⅛-inch spruce with cross struts glued and nailed between to retain the shape and brace. When nailing be sure to drill a small hole through each longeron before nailing to prevent splitting. The nose should be made from a thin piece of aluminum. When finished cover with paper and dope.

Main Planes

The main planes are built up the same as in the racing type models with the addition of ailerons on the top wing. The ailerons are of the balanced type; that is, a small portion extends forward of the pivoting point, and in the large machine assists the pilot in controlling the machine without fatigue.

The ribs are solid cut from 1/16-inch white wood and holes drilled and squared to take the main spars which are ¼ x ⅛ inch. The ribs are spaced to their relative positions which can be determined by use of the scale of inches shown. To use this scale ascertain the length on the drawing, then lay it on the scale and read the exact length. The first inch is divided into ⅛ and ¼ inches.

When ribs are in place the edging of 3/32-inch rattan or bamboo is glued in place. When making the top wing the ribs are cut out at the rear spar to allow for the ailerons which must be made separate. When finished the planes should be covered both sides with paper and doped. The interplane struts are made and fittings that consist of a cup for the strut and a flat piece soldered to it for fastening to the spar are nailed in place on the spars and the struts inserted as shown. Bracing wires to strengthen are also put in place and drawn tight.

Landing Chassis

The landing chassis must be made strong and fastened rigidly. The general view shown is enough to construct it and the struts are made from 3/16-inch rattan. The axle is ⅛-inch rod. The wheels rubber tired on wood disc 3-inch diameter.

Tail and Rudder

The tail and rudder are made exactly the same as wings and covered and doped as well. The ribs should be of a streamline form and not like the rib of the wing which should be the R. A. F. No. 6 to resemble its large prototype.

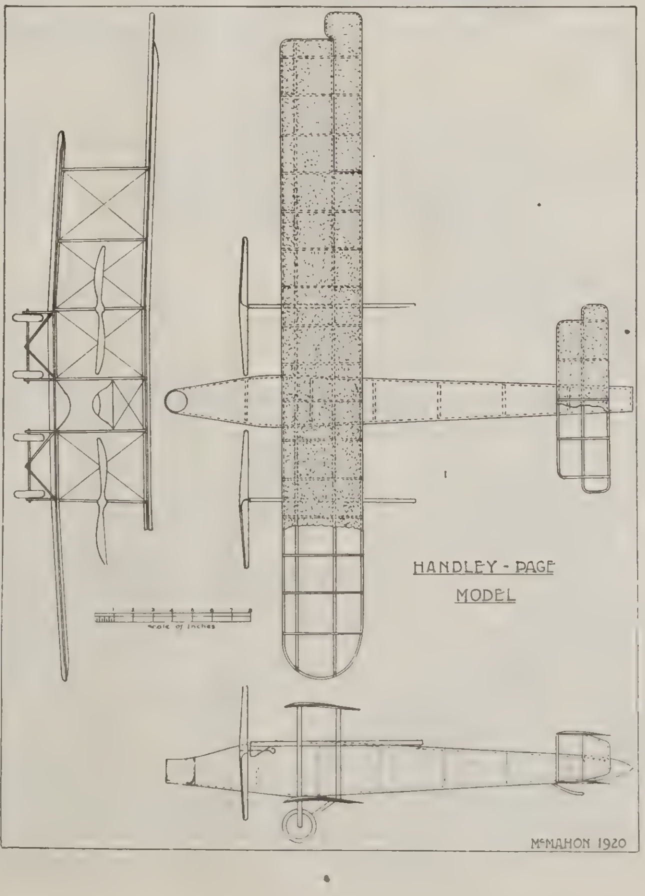
Motors

The motors are two in number and consist of a ¼ x 5/16-inch spruce member with a steel hook and propeller bearings at each end. The propellers are 12-inch diameter of high pitch and these are driven by 16 strands of flat rubber. To increase the duration of flight a geared propeller hanger can be used. The motor can be closed in as well if so desired by building a cowl around them.

The motor sticks are attached to the interplane struts by rubber bands which will allow them to be moved forward or back to balance.

Assembly

The body is inserted through the main planes and rest on the bottom wing spars, a rubber band holding it in place. The body can be moved to correct the balance also. The tail and rudder are fastened to the rear of the body and the model is ready for flight.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Obedience

After reading "Aeronitis" I am reminded of a very funny thing that happened to me while I was in France, so I am sending it to you to see if you think it is worth telling.

In October, 1918, I was transferred from the —— Pursuit Squadron, First Army, to the —— Pursuit Squadron, Second Army, as Flight Commander.

This was a new squadron just being formed, and all of the pilots were inexperienced as far as fighting at the front was concerned.

Naturally they had a thousand questions to ask and their favorite question was "How do you attack balloons?" "When can we get a balloon?"

Every one knows that getting balloons is about the meanest work a pursuit pilot has to do, and especially with "green" men.

I wanted to break them in "easy," so I told them to forget about balloons and that I did not want any of them shooting at balloons or fooling around them at all.

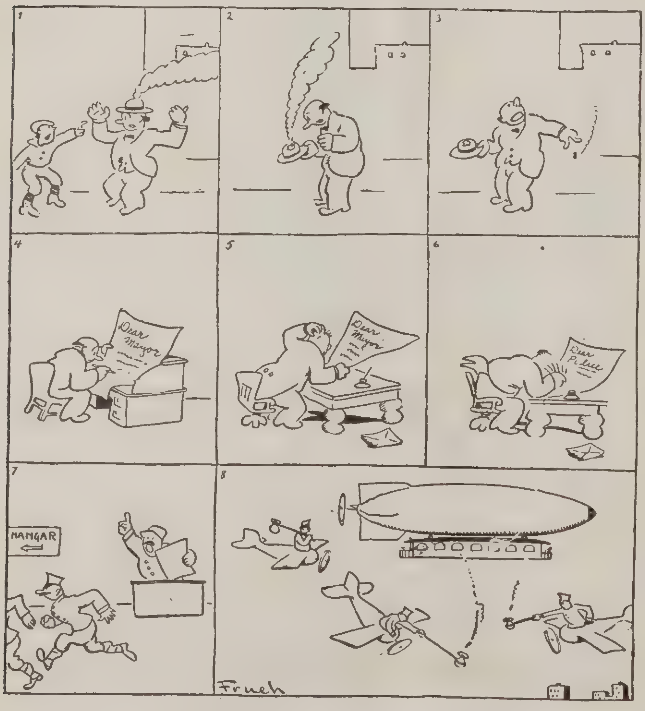
The next day as we were going out on patrol we flew to Pont-au-Moussoson and then turned west along the lines to patrol our sector.

When the patrol turned west one of the pilots did not see us turn, so he flew on into Hunland.

The first thing he knew he was directly over a balloon and was being "Archied." Not knowing where he was or what kind of a balloon he was over, he flew down close to the balloon, and, seeing it was a Hun, he came on home without firing.

When we came back to the aerodrome and he reported where he had been I asked him why he did not shoot the balloon, as he was on top of it, and he replied "You told me not to shoot balloons."

MAYOR HYLAN'S SKY COPS



With Apologies to Mr. Kipling

I've taken my "hops" as I've found them,
  And I've hopped them a lot in my time
And some of the busses were dizzy
  And some of the lot were fine.

I was a "rookey" at "Pensy."
  With M. M. 2c just from school,
And they slipped me a boot like a diver's suit
  And made me a Beach Master's mule.

Then I was shifted to meching
  Acting in charge of a plane,
O-XX was her engine,
  And Curtiss N-9 was her name.

Older than me, but my first 'ne
  More like a junk heap she were,
With a rock and a sneeze and a hell of a breeze
  I learned how to take off in her.

Now I aren't no hand with the blighters,
  For takin' them all along
You never can tell 'till there moting
  A half of what's apt to go wrong.

Sometimes she was off her ignition,
  Sometimes she developed a blow
'Twas always some darn thing or other
  To cut her R. P. M. down low.

The first time I shifted her motor
  And lined her up slick as a groom,
She hopped a first S. N. A. solo
  And zowey—she binged her pontoon.

He took the prize porpoise in landing
  And got the Flight Officer's goat,
When by essing and sliding and slipping and gliding
  He pancaked a mile from the boat.

Next I was shifted to night work,
  Acting in charge of repair,
Making new parts out of old ones
  With more than you start with to spare.

I'd change her lift bank and magneto
  And cleaned her all up to the best,
When along comes a wild-eyed instructor,
  To hop her material test.

He slipped her in at 6,000
  And might 'ave been spinning her yet
But the altitude registered zero,
  And the water—it registered W E T.

—Frank E. Ormsbee, CMM (A), USN (The Naviator).

Well, Hardly

Officer—Why are you begging on the streets?

Mendicant—You wouldn't expect to find me beggin' in an aeroplane now, would you?—*Yonkers Statesman.*

THE THIRD PAN-AMERICAN AERONAUTIC CONGRESS and the FIRST AERIAL TOURING CONGRESS

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The experience gained while touring some of the Southern States as the Fifth Liberty Loan Circus, demonstrated that "bombs" and dodgers and other advertising material fluttering from the sky into crowds is practical.

From your own experience, you realize that AERIAL ADVERTISING is a striking and efficacious method of presenting your product to the masses, and we have worked out several novelties unique in color and original in design, which will interest you. Compared with the results obtained, our rates are lower than you are now paying for newspaper and magazine space, and we can accomplish your aim efficiently and at less expense than you can do it by any other means.

We have a large staff of aviators and practical men in our employ for the mechanical part of our work, and in addition we have the advertising men and means of making your aerial advertising of extraordinary value. One of our representatives will gladly call upon you and outline our plan, without obligation.

This company maintains a register for Pilots, Aeronautical Engineers, and Mechanics available for aviation companies seeking the services of such. The above are invited to register their name, address, class of work, and salary expected. There is no charge to the companies or those registering for such service.

(The agency will be glad to hear from aviators and companies, or balloonists who have balloons, available for advertising purposes in any part of the world and who are in a position to undertake and carry out business of this kind. Information in regard to **special** *Aerial Routes in the United States furnished on application to* **prospective advertisers.***)*

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Used and approved by numerous U. S. Depts., industrial plants, and private engineers throughout the United States and abroad.

A problem like:—

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could not be solved heretofore in a practical way. Logarithms require 4 searches in tables, 4 mental interpolations, a subtraction, an addition; and then the answer is worthless unless checked. Longhand is out of the question. An adding machine may do this in from 60 to 100 movements,—after months of practice in dexterity and an outlay of several hundred dollars. A slide-rule will never solve this in 1000 moves (except the first 2 or 3 figures);

THE ROSS Precision-Computer

solves this in half a minute, thus:—

1. Set 74769 under arm 4 and 87965 under arm 3.
2. Bring 72638 under arm 4; ans. is under arm 3. Slide checks answer-locates decimal.

THE ROSS PRECISION-COMPUTER

is 100 times as accurate as the upper scales of a 10-inch slide rule; it corresponds to the upper scales of a slide rule 100 *feet* long; see diagram below. Reads 4 figures exact and 5th by interpolation, like 23674, 89673, 91678, 99897,—like a 10-to-the-inch scale, uniformly from end to end, without variation.

Reads 5-place logs and anti-logs; handles constants and exponential problems; has natural functions graduated to 2 minutes of arc, interpolable to fraction of a minute.

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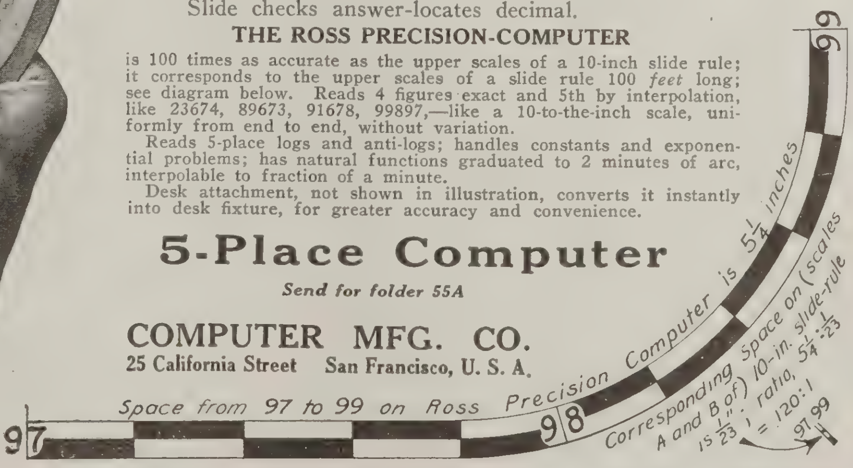
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(*Continued from page* 86)

desirable for long distance cross-country passenger-carrying service, where emergency landing fields are infrequent.

300 H.P. Pursuit Fighter, Type "D"

Official U. S. Government reports on the performances of the "D" pursuit fighter have shown its speed to be 147 miles an hour near sea level. Its landing speed is fifty miles an hour. The synchronized Browning machine guns are neatly enclosed in the engine cowling, with merely two small apertures through which the muzzles project.

The Type "D" is maneuverable and just as speedy as its appearance evinces. Exposed surfaces are carefully streamlined so as to obtain in speed the result of lessened resistance. Control cables are in most instances concealed. The leak-proof gasoline tanks used in the "D" fighter represent the highest development in this line.

General dimensions of the Type "D" pursuit fighter are: Span, upper wing, 30 feet; lower wing, 28 feet. Chord, 5 feet; Gap, 52 inches; stagger, 12 inches; length, 21 feet 6 inches; height, 8 feet 3 inches; area of main planes, 261 square feet; weight per square foot, 9.3 pounds. With a 300 h.p. Hispano-Suiza engine the weight unloaded is 1,666 pounds; useful load, 766 pounds. Weight per horsepower, 8.1 pounds. Fuel weighing 330 pounds gives a radius of action equal to 275 miles at full speed.

Sea level speed, 147 miles per hour; at 5,000 feet, 3 miles less per hour; at 10,000 feet, 8 miles less per hour and at 15,000 feet, 15 miles less. The climb to 5,000 feet is accomplished in 4 minutes 20 seconds; to 10,000 feet, 6 seconds less than 9 minutes; to 15,000 feet, 16¾ minutes.

Pursuit Fighter, Type "D2"

A further development of the Type "D" fighter, the "D2," is probably the fastest plane ever designed for the 300 h.p. Hispano-Suiza engine. A considerable reduction in weight has been brought about by the introduction of some unique engineering principles in the interplane trussing. The high speed is 165 miles an hour, but the landing speed is only 55 miles an hour.

Upper wing span, 28 feet; lower, 25 feet; wing chord, upper, 6.5 feet; lower, 3 feet; total wing area, 234 square feet; wing loading, 9.64 pounds.

The Type "D2" weighs 2,256 pounds fully loaded. The useful load is exceptionally high, 911 pounds.

Near the ground the speed is 165 m.p.h. Four minutes required to reach 5,000 feet, where the speed is reduced by three miles per hour. Time to 10,000 feet 8.5 minutes. Speed, 158 m.p.h. Time to 15,000 feet, 10 seconds less than 14 minutes; the speed at that height is 151 m.p.h.

Pursuit Fighter, Type "B"

The Type "B" pursuit fighter, designed and built for the United States Army Air Service, was declared to be the fastest plane built with a 160 h.p. Gnome engine. This little fighter was especially designed to carry a novel set of machine guns arranged under the upper and lower wings. The guns were not put in production, but the machine itself put up some notable performances.

The span of upper wing is 26 feet; lower wing, 23 feet; wing chord, upper, 48 inches; lower, 45 inches; area of wings, 180 square feet; length over-all, 18 feet 10 inches; height, 7 feet 4 inches; gap between wings, 44.5 inches; stagger, 12 inches.

With its full load the Type "B" weighs 1,290 pounds. Useful load, 305 pounds. Weight per horsepower, 8.05 pounds. Weight per square foot of supporting area, 7.16 pounds.

Slow speed, 45 miles an hour. Sea level speed, 135 m.p.h.; at 5,000 feet, 132 m.p.h.; at 10,000 feet, 126 m.p.h.; at 15,000 feet, 118 m.p.h. The climb to 5,000 feet occupies 3 minutes 20 seconds; to 10,000 feet, 7 minutes; to 15,000 feet, 15 minutes 11 seconds

Mail Carrier, Type "F"

Arrangement for carrying mail or light express is easily made with the Type "F" plane. Roomy compartments are available because of the width and the spacious design of the fuselage. Dimensions are not in any way changed and the performances are equal to those of the "F" type Tourister.

Engine, 150 h.p. Hispano-Suiza. Dimensions: Span of both upper and lower wings, 38 feet; length, 24 feet 10 inches; wing area, 355 square feet.

Mail or merchandise weighing up to 550 pounds may be carried in addition to the fuel to travel 290 miles. Carrying capacity may be increased by taking on less fuel with a proportionate reduction in the range of miles to be traversed.

AERIAL AGE
WEEKLY

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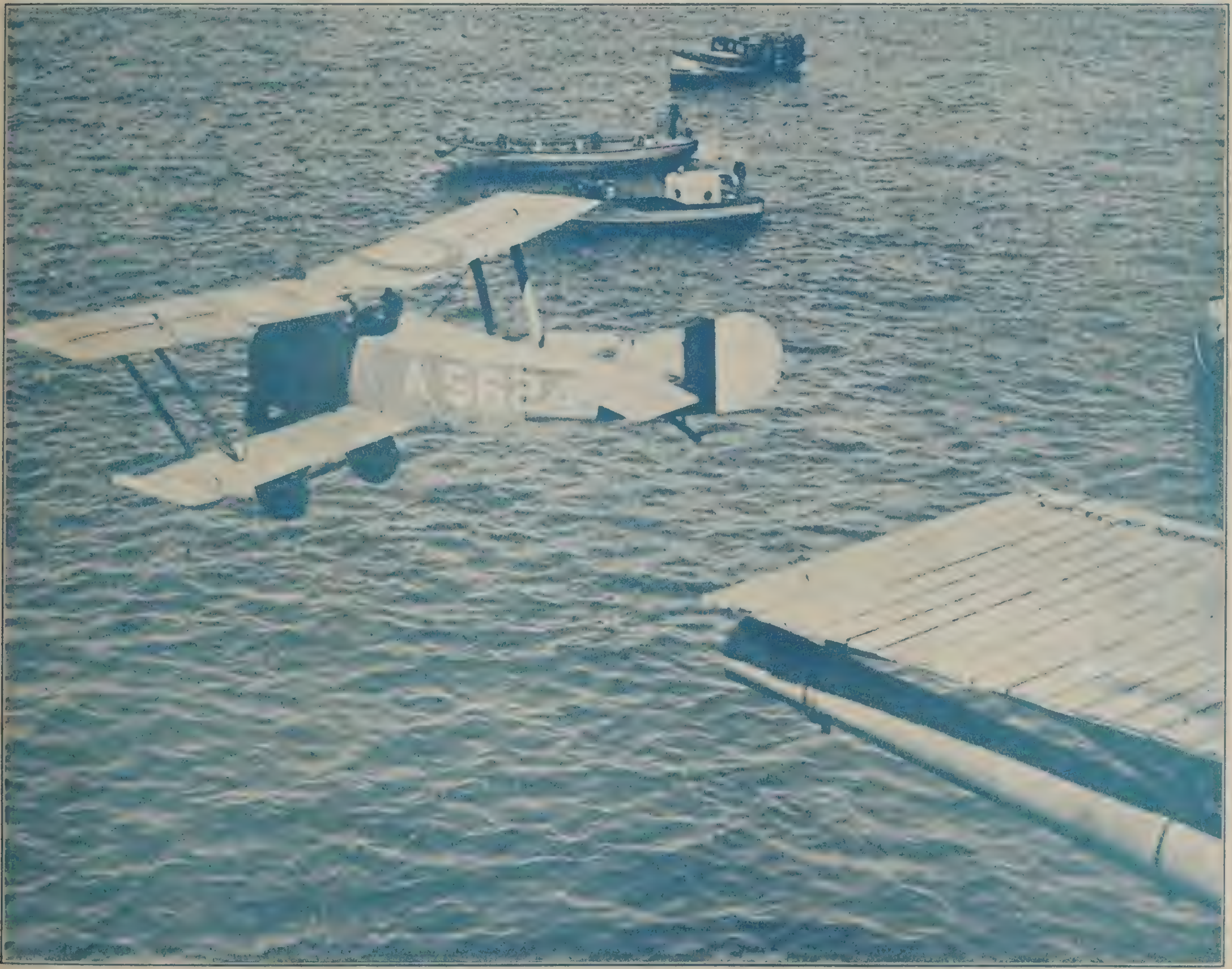

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Ensign Franklin Young Flying Off the Gun Platform of the U. S. S. Mississippi

President Wilson to Open Third Pan-American Aeronautic Congress By Radio from White House

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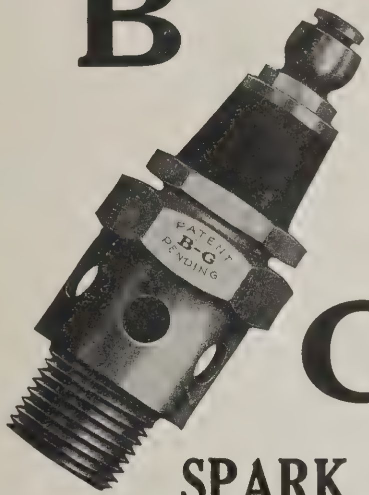

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AERIAL AGE
WEEKLY

VOL. XI APRIL 5, 1920 NO. 4

TABLE OF CONTENTS

PAGE

President Wilson to Open Third Pan-American Aeronautic Congress by Radio from White House 111

Plans to Hold Aerial Derby Around South America, Aerial Derby Around the World and Aerial Circuits of the Atlantic, Annually... 112

The News of the Week............ 113

The Aircraft Trade Review....... 115

U. S. Aerial Mail............... 116

The Stinson "Greyhound"........ 117

Description of Apparatus for Measurement in a Wind Tunnel of the Performance of an Airscrew or the Windage Torque of a Rotary Engine...................... 118

Fuselage Stress Analysis.......... 119

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures............. 124

Naval and Military Aeronautics... 125

Foreign News.................... 126

Elementary Aeronautics and Model Notes......................... 127

Aeronitis....................... 128

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167

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PRESIDENT WILSON TO OPEN THIRD PAN-AMERICAN AERONAUTIC CONGRESS BY RADIO FROM WHITE HOUSE

Navy Department to Participate

THE Aero Club of America was officially advised to-day that President Wilson will open the Third Pan-American Congress by radio from the White House.

The Congress will open at the Steel Pier, Atlantic City, May 20th to May 30th. A receiving apparatus will be set up on the pier and at three o'clock in the afternoon, the hour set for the official opening of the Congress, President Wilson's radio message, formally opening the Congress, will be received.

It is expected that the official representatives of thirty-two countries and delegates from sixty aero clubs and five thousand civic bodies, automobile and yacht clubs, chambers of commerce and other scientific, educational and commercial organizations will be present and the Congress will be the greatest aeronautic event ever organized.

Governments, Aero Clubs, Sporting, Scientific, Industrial and Civic Organizations Invited

The program is most thorough and complete. Tens of thousands of people of different lines of human endeavor related to aeronautics are invited to attend the Congress. For instance, on the day when the "Large Dirigible and Its Value for Transportation" is discussed, the representatives of railroads, express, steamship and other transportation organizations are invited to attend.

For the illustrated address on "Aerial Forest Patrol" the Forestry Department of every State are invited. For the discussion of the "Work of Aerial Police Squadrons and Why Every City Should Have One" the Police Commissioners of all cities are invited

For the illustrated address on and consideration of "Aerial Mail Plans" the Chairman of Post Office and Post Road Committee of House of Representatives and Senate and Postmaster General Burleson and 26,000 United States postmasters, and Chambers of Commerce and 13,000 cities are invited to attend.

Likewise for the illustrated address on the "Need of Municipal Aerodromes and the Part to Be Played by Aircraft in City Planning" the Chambers of Commerce and City Planning Commissions of 13,000 cities are invited to attend. Those present will be given carefully prepared plans telling how to establish aerodromes and make them self-supporting.

For the discussion of "Pan-American Aerial Transport" the commissions of the twenty Latin-American Republics are invited to attend.

For the discussion of "Aerial Navigation Instruments for Flying Over Land and Water" aviators, navigators, scientific instrument makers and aeronautic experts are invited to attend.

For the addresses on "Aerial Photography" all the photographers, professional and amateur, and makers of photographic apparatus are invited to attend.

For the addresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic Survey" all people interested in exploration and surveying are invited to attend.

For the addresses on "Need of Broader Attitude Regarding Insurance for Aircraft and Aviators" all the insurance companies and agents are invited to attend.

For the discussion of intercollegiate aeronautics 600 universities and colleges are invited to send delegates.

For the addresses on "Aerial Jurisprudence—Aerial Laws and Regulations of Air Traffic" all lawyers, traffic commissioners and police authorities of different countries are invited to attend.

The engineers are invited to attend the aeronautic engineering meeting when basic problems of aeronautic engineering are to be discussed.

One of the subjects to be discussed will be "The Newspapers' Great Contribution to the Devolopment of Aeronautics," at which data will be presented showing the great influence on the development of aeronautics which the several hundred prizes offered by newspapers the world over during the past twenty years have had in popularizing aeronautics. Also statistics showing the extensive increase in circulation which came from the offer of aeronautic prizes.

Alberto Santos-Dumont, the pioneer Brazilian inventor and aeronaut who spent over half a million dollars in developing the sport of aeronautics since 1901, when he first piloted a self-invented dirigible around the Eiffel Tower in Paris, is the chairman of the committee in charge of the Congress.

The Congress is held under the auspices of the Aero Club of America, the Pan-American Aeronautic Federation, the Aerial League of America, the Liga Aerea de Cuba, the Aerial Touring Association and the Aero Club of Atlantic City.

Mr. Santos-Dumont, who is vice-president of the Aero Club of America and president of the Pan-American Aeronautic Federation, states that "aerial transportation and aerial sports will knit the states of the Western Hemisphere into an integrally united, co-operating and friendly combination, allied for well-being in sport, trade and commerce, as well as for strength in time of possible war."

As chairman of the Pan-American Aeronautic Committee he has been traveling through South and Central America, creating interest in aeronautics.

Commodore Louis D. Beaumont, member, Board of Governors, Aero Club of America, the chairman of the commission organizing the First Aerial Derby Around the World, and Major Charles J. Glidden, the originator of the Glidden Tours and president of the Aerial Touring Association, who started for the trip around the world last October, have personally extended invitations to the authorities, aero clubs and other organizations of all the countries visited.

This Congress will open a new epoch in aerial sport which has been dormant since the beginning of the war. As there are 18 international and national contests being organized, with prizes amounting to over $2,000,000, open to American pilots holding the international pilot certificates, and the Aero Club of America alone has issued 8,000 of these pilot certificates, and Great Britain and France and Italy have issued over 10,000 pilot certificates each, the stupendous aerial contests being organized are assured of success. The regulations for the Pan-American Aerial Derby, the Aerial Derby Around the World and the Aerial Circuit of the Atlantic are to be discussed during the Congress at Atlantic City.

PLANS TO HOLD AERIAL DERBY AROUND SOUTH AMERICA, AERIAL DERBY AROUND THE WORLD AND AERIAL CIRCUITS OF THE ATLANTIC ANNUALLY

A STUPENDOUS plan to hold every winter an Aerial Derby Around the South American Continent, every summer an Aerial Derby Around the World and every autumn a Circuit of the Atlantic is being sent to France to the International Aeronautic Federation by the Aero Club of America. It was taken to France by Dr. Frank S. Lahm, the pioneer aeronautic expert, father of Colonel Frank P. Lahm, U. S. Army, Air Service, who was the first Army man to fly with Orville Wright in the first Army aeroplane, which was ordered in 1907. He sailed on the "La France."

Mr. Lahm, who was one of the founders of the Aero Club of America, is vice-president of the International Aeronautic Federation, the organization which makes the regulations for aeronautic contests and homologates all aerial records. He resides in Paris, is a member of the Aero Club of America's Foreign Service Committee, and is one of the club's delegates in the Federation. Mr. Lahm will also arrange for the participation of three American teams in the International Aviation Trophy contest to take place in France in September.

Derbies Will Be Discussed at Atlantic City During Third Pan-American Aeronautic Congress, May 20th to May 30th

Representatives and delegates of aero clubs, chambers of commerce, auto clubs and universities of thirty-two countries will discuss the rules and regulations for these great contests during the Third Pan-American Aeronautic Congress to be held at Atlantic City, May 20th to May 30th.

The three important aerial events to be held annually which Mr. Lahm will submit to the consideration of the national aero clubs of the eighteen countries of the International Aeronautic Federation are described in a letter addressed to AERIAL AGE WEEKLY, which has also been sent to several thousand organizations the world over, including aero clubs, chambers of commerce, automobile clubs, universities, commercial organizations, manufacturers, and national, state and civic bodies, inviting each to send three delegates to the Congress.

The letter addressed to AERIAL AGE WEEKLY reads as follows:

MY DEAR EDITOR:

Your opinion and advice and the opinion and advice of AERIAL AGE readers is invited on the following plan to hold three important international aerial contests each year, in which all the aero clubs of the world affiliated through the International Aeronautic Federation can participate, which has been submitted to the Aero Club of America by the Aerial League of America.

The Aerial League of America points out that the flights across the Atlantic, and from London to Australia, London to India, Rome to Tokio, Paris to Dakar, and other stupendous flights, open a new epoch in aerial navigation and that in addition to the annual international contests for the Gordon Bennett, Jacques Schneider, Michelin and other trophies, which afford a test to the progress in aircraft design and airmanship, it would be most advisable to hold three international long distance contests, which will make it possible to test the progress made each year in every phase of the art of aerial navigation and will be sufficiently extensive to enable all the civilized countries of the world to share in the organization of the events as well as to participate in them.

The Aerial League of America, after giving lengthy consideration to the subject and having ascertained the possibilities of securing large prizes and extensive participation for three international Aerial Derbies, proposes the following Derbies be held annually:

(1) The Pan-American Aerial Derby to be held every winter. The competitors in this Derby will start from Miami or Palm Beach either in November, December or January each year and fly to Cuba, then to Guatemala, then to Panama and across the Isthmus to Colombia, Ecuador, Peru, Chile and from there either across Argentine or by another route to be decided to Buenos Aires, Argentine, then to Uruguay, Rio de Janeiro, Brazil, Pernambuco and along the coast to Guiana, Venezuela, then across the Caribbean Sea to Porto Rico, Haiti, Cuba and back to the United States.

(2) The Aerial Derby Around the World, the rules and regulations of which are being considered by the International Aeronautic Federation, which will start in June each year and, presumably, will occupy from three to four months during the first two years, and then only two months each year thereafter. The rules and regulations for this stupendous event have been submitted to the national aero clubs of the eighteen countries affiliated in the International Aeronautic Federation, by the Aero Club of America, through the International Aeronautic Federation for approval and the Special Commission of the Aero Club of America and the Aerial League of America has visited and organized aero clubs in Japan, China, Manchuria and other countries, which clubs are affiliated with the International Aeronautic Federation and will assist the other national aero clubs in organizing and running the Aerial Derby Around the World each year. Each national club will have direct charge of the Aerial Derby over the territory over which it has jurisdiction under the regulations of the International Aeronautic Federation.

(3) The Aerial Circuit of the Atlantic will be held in the latter part of the summer and it is expected that while the first year would require two months to complete this event, thereafter it will probably not require more than one month. This circuit will be run from west to east or from east to west. From west to east will be better at certain times of the year because of the prevailing easterly winds in one way and prevailing trade winds in the other way. The route can, however, be reversed the following year so as to afford a thorough test of the conditions from east to west. In this case the competitors, which will include a piloting class as well as a passenger class, will start from any one of the countries on the Atlantic seaboard and make the circuit of the Atlantic. For instance, competitors starting from New York or Atlantic City will fly southward by way of Cuba, Haiti, Porto Rico, across the Caribbean Sea to Caracas, along the coast to Pernambuco, across the Atlantic to Dakar, on the west coast of Africa, then northward along the west coast of Africa touching Magodor and Casa Blanca, then across Spain or Portugal to Biarritz, then along the French coast and across the English Channel to London, then either across the Atlantic by way of Ireland to Newfoundland, or touching and across the Atlantic by way of Iceland, Cape Farwell, Newfoundland, Halifax, Boston, Portland and New York.

These three important international aerial derbies will afford a supreme test annually to both lighter and heavier-than-air aircraft, as well as to airmanship and to the science and art of aerial navigation in general.

These three important events will be held annually under the rules of the International Aeronautic Federation and their main purposes will be as follows:

(1) To open the world's airways in the name of progress and introduce the use of land and water aeroplanes and dirigibles for air travel, aerial transportation and aerial touring throughout the world.

(2) To strengthen the cordial relations and hearty cooperation for the development of international aeronautics which exist between the national aera clubs of the countries affiliated with the International Aeronautic Federation and between the national clubs and the state and city aero clubs of each country which are affiliated with the national aero clubs, by organizing these historic world events in which they can all participate.

(3) To encourage the study of the world's possible airways in relation to the world traffic and commerce, where aircraft can solve difficult problems of transportation.

(4) To make known that landing places are to aircraft what good roads have been to automobiles, and to start action in establishing airports with suitable landing facilities and supplies for land and water aeroplanes and dirigibles throughout the world.

(5) To foster the establishing of permanent aerial transportation lines throughout the world, where aircraft will greatly reduce the time of travel required by other means of transport, and the establishing of aerial mail lines throughout the world.

(6) To make known that the aeroplanes which have flown across the Atlantic are to be followed by other aeroplanes capable of carrying fifty or more passengers and affording Pullman car accommodations, and that the British dirigible R-34 is to be followed by dirigibles many times larger, one being in Great Britain under construction which has ten million cubic feet hydrogen capacity and will lift 303 tons, of which 100 tons will be for cargo, and will be capable of navigating the air for 25 days, or 36,000 miles, without stopping, at a speed of sixty miles an hour.

(7) To foster the design and construction of efficient aircraft with a view to greater range of flight and greater safety of air travel.

(8) To test the reliability and economy and bring about improvements in aircraft motors.

(*Contued on page* 123)

THE NEWS OF THE WEEK

Major Pollock Returns to U. S. With Salmson Plane

Major Granville A. Pollock, commander of the New York Aerial Police, who went to France several weeks ago, has returned to the United States with a Salmson aeroplane.

It is expected that the machine will be flown to Atlantic City, where it will be exhibited at the Third Pan-American Aeronautic Congress on May 20th to May 30th. Pollock aroused great interest and brought international distinction to the New York Aerial Police by his practical demonstrations of the value of the aerial police. Having served with the British beginning with 1914 and then with the French in the Lafayette Escadrille and in charge of testing aeroplanes at the American acceptance station, at Orly, Major Pollock has a wide acquaintance in Europe.

Balloonists Fly 1,200 Miles

Four naval balloonists recently made a balloon flight of 1,200 miles. They flew from the Naval Air Station, Pensacola, Fla., to Murdock, Ill., near Chicago.

London Paper Gets Aerial News Story

London.—The *Chronicle,* a London newspaper, recently received the first wireless telephonic press message from an aeroplane which carried one of its representatives in a hundred-mile flight.

Not only was telephonic conversation kept up with the Chelmsford Marconi wireless station during the flight but the whole course of one machine was guided by telephoned instructions. The apparatus carried had for direction finding a range of 300 to 400 miles and for telephony 100 to 150 miles.

Prodger Organizing California Company

Clifford B. Prodger, the super-test pilot, who, during the war had a total of five or six thousand hours of test flying, is now in America and is planning to organize a large company in Southern California.

Mr. Prodger secured his license at Mineola in the very early days of aviation and he has probably had a more consistently successful record than any aviator alive to-day.

Handley Page, the well-known aeronautic designer and manufacturer, who is now on a short visit to America

We extend to Mr. Prodger on his return to America our cordial greetings and our wishes are for his success in his new undertaking.

The Bellanca C. E. Two-Seater

With the completion of satisfactory arrangements for delivery of Anzani motors, the Maryland Pressed Steel Company's aircraft department announces preliminary particulars of the testing of the Bellanca C. E. at their Hagerstown flying field. Under adverse weather and ground conditions, the machine's "first flight" registered 99 m. p. h. with the motor running at 45 h. p. and a 6,000 feet climb in ten minutes.

Prof. Bellanca, the designer, and test pilot, Paul Stonebreaker, assert that these speeds will be exceeded.

The Maryland Pressed Steel Co. are proceeding with their plans to enlarge their already extensive production facilities and with a number of completed machines ready for early delivery a larger quantity in various stages of construction and assemblage.

The test flight was undertaken in the presence of a large gathering of Maryland fliers who expressed their opinion that the Bellanca meets an extensive immediate and future demand for a light passenger-carrier equally suitable for school, exhibition and commercial work.

Harry E. Tudor, Sales Manager of the Department, on his return to New York, announced that the demands for the machine had exceeded the anticipations of the company and that plans for supplying them as promptly as possible are well advanced.

Seaplane Establishes New Record at Miami

Miami, Fla.—An aerial record was broken recently when sixteen persons were carried from Bimini Key to Miami aboard the huge H-16 Curtiss seaplane. The trip of 45 miles required only 35 minutes. The plane is equipped with two 400-horsepower Liberty motors. Among the passengers were Rodman Wanamaker, 2d, of Philadelphia, and J. H. Porter, president of the Calumet Steel Company, Chicago.

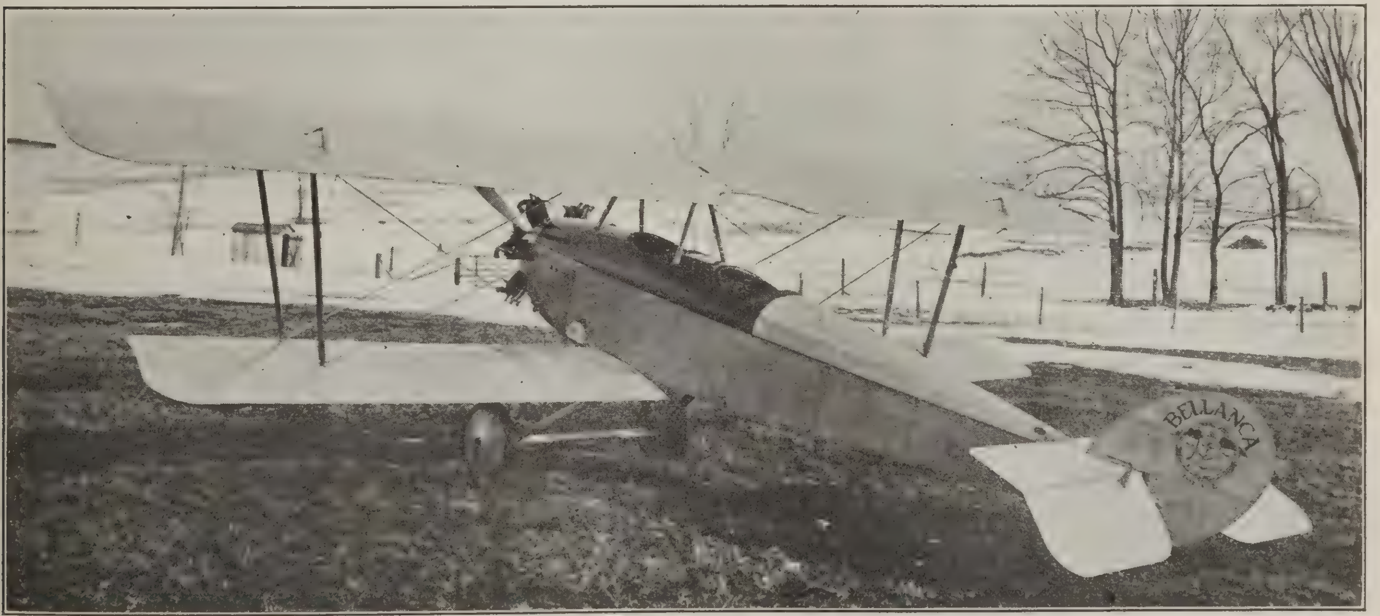
The machine is being run by the America-Trans-Oceanic Company.

Irvin Cobb, the famous writer, recently flew from Miami to Bimini on the H-16.

Army Balloon Reaches 45,225 Feet

Aberdeen, Md.—An interesting balloon observation was made at the Aberdeen proving ground last week by the Signal Corps meteorological station.

The balloon was released at 7.47 a. m. and observed for 58 minutes, reaching in that time an altitude of 45,225 feet, or more than 8.5 miles.



The Bellanca Biplane, manufactured by the Maryland Pressed Steel Co., photographed just prior to its recent successful flight tests

The British Aircraft Sale

With reference to the announcement which appeared in AERIAL AGE last week regarding the large transaction in British aircraft, the syndicate interested is the Aircraft Disposal Company, Limited, by whom the following announcement has been made:

"The sale by the Government of all its surplus aircraft material, engines, spares and accessories was completed at the end of last week. We did not purchase direct from the Government, but we have now taken over the whole of the benefits and liabilities of the purchasers.

"The company, which comprises widespread British interests, has been specially formed to carry on the whole of the work previously undertaken by the Ministry of Munitions in disposing of the surplus stocks of heavier-than-air machines and equipment. Offices have been taken in Kingsway and as rapidly as possible the organization will remove there from the present Disposal Board Offices. The whole of the storage organization and the management of the large Aircraft Depots all over the country will pass into our control.

"The Disposal Board since the Armistice have sold large numbers of machines, but their potential sales have been very much handicapped by their limitation to selling machines as they stand. Many of the machines for disposal are quite new, but in order to ensure that every machine, engine accessory and spare is in perfect condition detailed inspection will take place before delivery, and Certificates of airworthiness will be given for all machines sold.

"Handley Page, Limited (the well-known Aircraft Manufacturers), are members of the Syndicate, and we shall have the full advantage of their experience in aircraft matters, as they will act as our technical advisers and be our sole Agents for the disposal of the material."

New Navy Seaplane Tried Out

The new ship-aeroplane, a seaplane built to take off from the turret of a battleship, had its trial flight recently at the Keyport, N. J., factory of the Aeromarine Plane and Motor Company.

The plane was piloted by C. J. Zimmermann, chief test pilot of the Aeromarine Company. On its take-off it got off the water after a short run and was timed at five seconds.

In the test the machine demonstrated its ability to climb very rapidly under the impulse of a small propeller with a high pitch. No test of ground speed was made, but the Navy estimate calls for 110 miles an hour and the plane has been built with this as well as climbing ability in mind.

The seaplane rests in the water on two pontoons, light, but strong enough to bear the plane easily over the roughest seas. Pilot and observer sit one behind the other in the fuselage just back of and below the upper wing. The pronounced "stagger" makes it possible not only to see everything above, but also ahead and directly downward. The excessive stagger has another merit, for the fact that the wings are not directly above and below each other gives monoplane lift.

The construction of the machine is such that the observer is able to swing a mounted machine gun in almost an entire hemisphere. The rudder is so designed that no part projects above the fuselage. This makes it possible to get a shot directly in the rear.

A 300-horsepower Wright-Hispano is used and the weight of the plane empty is 1,743 pounds. Loaded with pilot, passenger, fuel and ammunition the weight is 2,730 pounds.

The overall length is 30 feet and the height slightly more than 11 feet. The span of the upper wing is 37 feet 6 inches and the lower a foot less.

Marconi Device Aids Flying in Fog

London.—A new Marconi device which should go a long way in solving that hitherto insurmountable problem, the aviator's worst enemy—fog—has been tested by Clifford Whitley, flying in a Handley Page aeroplane.

By means of the new device it is possible for a machine fitted with wireless telephone apparatus to ring down to a wireless station 100 miles away and ask its position, and, within a minute, the pilot can be told the station's exact location.

Test Orenco Tourist Plane

The new Orenco four-passenger tourist aeroplane, designed and built by the Ordnance Engineering Corporation, was given its first trials reecntly and performed exceptionally well.

The Avro Baby, with 35 H.P. Green Engine, the winner of a recent aerial derby around London. Photo courtesy of Captain H. S. Broad, R. A. F.

The plane was piloted by Arthur O. Heinrich, who first took the machine up alone. It left the ground before running 200 feet, and climbed very fast.

On the second flight Pilot Heinrich took off with one passenger in the front seat. The planed handled excellently and it is of interest to note that with engine throttled low, and with the pilot's hands entirely free from the controls, the machine assumed a very good gliding angle itself.

On the next trip the pilot took up three passengers, Mr. George F. McLaughlin occupying the seat next to the pilot. The plane took off with less than a 300-foot run, climbed well and rose to about 3,500 feet. It made a cross-country flight, for which purpose the tourist type was designed, the trip lasting nearly an hour.

The machine is equipped with a Hispano-Suiza engine of 150 H.P. and averages over 90 miles per hour with four passengers.

Col. J. de M. Thompson at Miami, Fla.

Colonel Jefferson de Mont Thompson, president of the Aero Club of America, and chairman of the New York State Aviation Commission, accompanied by Major Robert Graves, arrived recently at Miami, Florida. Colonel Thompson and Major Graves have made an extensive survey of the Government landing fields along the Atlantic Coast, with a view to establishing and improving landing fields throughout the State of New York.

New Type of British Aeroplane Engine

Tests have been completed at Manchester, England, of a new type of aeroplane engine which will be silent and from which the danger of fire in the air has been removed. The tests were made on a converted engine that had been previously operated on the Otto cycle system.

At present the exhaust pressure of the gases is very high in ordinary aeroplane engines, producing considerable noise. Under the system used in this engine the exhaust gases leave the engine at ½-pound pressure per square inch, which results in "silent" operation. With so great a reduction of the temperature, it is claimed to be impossible to get a flame from the exhaust in any circumstances. The further claim is made that cheap heavy crude oil can be used in these engines, and that full power can be produced at altitudes up to 20,000 feet.

View Real Estate from Air

Selling real estate by the use of an aeroplane by showing customers of land purchasers their holdings from the air is a new experiment which has just been worked out successfully at Spokane, Wash.

A wide-awake realty firm had 150 tracts of land to sell. They contracted with the Symons-Russell Aviation Company of Spokane to carry each purchaser of a tract over his land and also the surrounding farms. The real estate man claims the people will be better pleased with their buys, and that by showing them the developments of the nearby plots they will be induced to build homes and improve their places.

The contract with the Symons-Russell Company called for carrying 150 persons, and this is thought to be one of the largest commercial aerial passenger contracts ever signed up in the West, if not in the entire United States.

The AIRCRAFT TRADE REVIEW

Asks City for Aeroplane Landing Field

Winnipeg, Man.—The Lawson Air Line Corporation is asking the City Council for land to be used as a landing place for its aerial liners. This aerial line will connect Winnipeg with St. Paul, Minneapolis, Duluth, New York and San Francisco. Five large aeroplanes will be available by June 1 if dockage is secured here.

New Rigid Airship Designed by Aerocruiser Company

The Aerocruiser Company of America, with headquarters in Washington, D. C., have designed a new type of rigid airship which is entirely new idea in aeronautics over the stereotyped shapes of machines which are fixed in the minds of flyers.

Its formation may best be described as that of a thick inverted "U". It is claimed by the inventor that the channel formation lessens resistance, thereby materially assisting in clearing through the air. The four power plants will produce 1,000 h.p. and are located in the channel. This places the driving power nearer to the center of resistance and adds materially to the speed of the airship.

The framework of the machine is of the double Howe truss type which gives greater strength and rigidity to the airship which will allow the installation of heavier and higher powered driving plants. The engines are of special design, having sixteen cylinders hooked together in tandem type and weigh approximately 3,000 pounds each. The engine units are designed to develop 1,000 h.p. each at 1,200 revolutions and will drive the machine 100 miles per hour or better.

Due to the formation of the airship greater gas capacity may be obtained, streamlining to such fine degrees as applied in the Bodensee are deemed unnecessary. A 530-foot airship of this type will weigh approximately 135,000 pounds and have a gas capacity of 3,800,000 cubic feet.

The machine is designed to carry not less than 200 passengers and is fitted with a double deck cabin with all modern conveniences. The Aerocruiser Company built a model to scale of the 530-foot type driven by electric motors.

Zenith Carbureter on Schroeder's Plane

It is of interest to know that on Major H. W. Schroeder's record-breaking flight of 36,020 feet altitude his aeroplane was driven by a Liberty engine equipped with Zenith carbureters.

Hurst Company Building New Machine

The Hurst Aeroplane Company of Evansville, Ind., formerly at Terre Haute, Indiana, is now completing the construction of its second aeroplane. It is a two-seater, tandem tractor, equipped with a Curtiss OX-5, 90 H.P. engine.

This company is making excellent progress, and is organized to build commercial aeroplanes and seaplanes. Plans are being completed for a six-passenger machine.

They have obtained an excellent flying field of 80 acres in Evansville. It is located on the aerial routes from Chicago to New Orleans, and New York to St. Louis.

Robert B. Knight is the Kentucky representative of the Hurst Company.

The officers of the company are: M. V. Yaeger, president; E. H. Snyder, vice-president and manager; E. H. Hermann, secretary, also secretary of the Evansville Chamber of Commerce; B. H. Bibber, treasurer; and A. G. Riggs, chief engineer.

Goodyear Establishes California Field

To stimulate public interest in aerial transportation, the Goodyear Tire & Rubber Company of California, co-operating with the city of Los Angeles, Cal., has established a municipal aviation field at its new factory now under construction in the California city.

Comprising eighty acres, the flying field, loaned by Goodyear to the municipality, has four hangars for the accommodation of aeroplanes and within the next month an addition of a complete airship hangar will be made. It is the intention of Los Angeles officials to have the coast Wingfoot field open to use by any planes wishing to land to discharge or take on passengers, or in the event that re-fueling is necessary.

Three quarters of a mile long and half a mile wide, the field will offer every facility for safe and easy landings. Although entirely level and composed of hard ground, allowing landings to be made anywhere, a stretch of fine turf 400 feet wide, running diagonally across the field, will assure landings and take-offs under ideal conditions. This green diagonal will also help to mark the field, so that it can easily be distinguished by aviators. Painted stripes on one of the 130-foot smokestacks of the factory will serve as a further guide to fliers.

The airship hangar will house any dirigible landing at the field, but will especially be used to shelter the new tractor "Pony Blimp" Goodyear has constructed for commercial purposes and which will be shown for the first time at San Francisco aero show in April. It is probable that this ship will be taken to Los Angeles after the show and several flights made.

Los Angeles officials believe the new Wingfoot field will be widely used by fliers, as there is great activity in aeronautics on the coast. It is probable that fueling facilities and aviation mechanics will be supplied eventually.

To Deliver Food by Airplanes

Stewart, B. C.—Three aeroplanes will be operated here this summer delivering food and light freights to mines in difficult locations. They will carry ore back to the coast and will be quite an assistance in prospecting. The machines will have a radius of 450 miles.

U. S. Helium Plant Nearing Completion

Fort Worth, Tex.—A great helium plant from which the United States Government hopes to obtain non-inflammable gas in sufficient quantities to supply its military balloons is near completion here. Installation of machinery has begun, and it is expected the plant will be in operation by August 1 unless Congress should fail to further support the undertaking. Helium is extracted from natural gas by a secret process.

Construction of the plant, the only one of its kind in the world, and at a cost of approximately $5,000,000, was started during the world war following a series of experiments conducted by Army and Navy experts here and at Petrolia, Tex. Beyond the fact that a non-inflammable, non-explosive gas had been developed, the results of the experiments have remained a secret.

First Carload of Curtiss Machines to Reach Spokane, Wash.

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, Assistant to the Second Assistant Postmaster General in Charge of Aeronautics
Louis T. Busslor, Chief of Maintenance and Equipment

J. Clark Edgerton, Chief of Flying
John A. Jordan, Chief of Construction
George L. Conner, Chief Clerk, Aerial Mail Service
John A. Willoughby, Operator in Charge Radio Experiments
Eugene Sibley, Operator in Charge Radio Maintenance and Operation

US
AERIAL MAIL

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Merrill K. Riddick
Robert H. Ellis
Randolph G. Page
Paul S. Oakes
Herbert M. Crader

Charles I. Stanton, Superintendent New York-Washington Division
George O. Noville, Superintendent New York-Cleveland Division
Edward McGrath, Superintendent Cleveland-Chicago Division
William J. McCandless, Superintendent Chicago-Omaha Division
Harry L. Hartung, Manager, Heller Field, Newark
Herbert Blakeslee, Manager, Bustleton
Eugene W. Majors, Manager, College Park
Andrew R. Dunphy, Manager, Chicago
Maurice J. Kelly, Manager, Bellefonte
Victor W. Fitch, Manager, Newark Warehouse

PILOTS

Samuel C. Eaton
Frederick A. Robinson
Elmer G. Leonhardt
Walter J. Smith
Paul W. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris
Clayton W. Stoner
Mark C. Hogue

The Reliability of the Aerial Mail

As a demonstration of the reliability of the Liberty engine, the efficiency of the aerial mail pilots and the aeroplane mechanics in the aerial mail service, the Post Office Department points to the remarkable performance of the twenty aerial mail aviators now in the service who during the past eight months have made 1,111 trips carrying the mail with but 47 forced landings through mechanical trouble.

At the head of the list of aerial mail pilots stands J. H. Knight, who between July 1, 1919, and February 29, 1920, flew 106 trips, aggregating 24,020 miles, with but one forced landing because of mechanical trouble, seven forced landings on account of weather, and but two defaulted trips in eight months' flying. He completed 92.59 per cent of the trips he was scheduled to fly, and of the trips flown he made 92.45 per cent without forced landings for any cause.

Pilot H. T. Lewis stands a close second, with 90 trips aggregating 18,920 miles and but two forced landings, one of these being caused by running low for fuel in battling against a hard head wind. He had but one forced landing on account of motor trouble and no forced landing on account of weather. His defaulted trips in eight months number eight. He completed 92.85 per cent of the trips he was scheduled to fly, and of the trips flown he made 97.77 per cent without forced landings for any cause.

Pilot Max Miller is third in the list. Out of 90 trips aggregating 19,255 miles he had but two forced landings for mechanical trouble. His defaulted trips in eight months numbered twleve. Pilot Miller completed 88.33 per cent of the trips he was scheduled to fly, and of the trips flown he made 99.44 per cent without forced landings for any cause. Weather conditions caused him to set his plane down only three times.

Other remarkable records of flights with but one forced landing because of mechanical trouble were R. H. Ellis, one in 74 trips aggregating 18,035 miles; E. H. Lee, one in 77 trips aggregating 15,671 miles; J. M. Miller, one in 58 trips aggregating 18,505 miles; and E. G. Leonhardt, one in 46 trips aggregating 13,700 miles.

Six pilots, Lewis, Miller, Knight, Ellis, Stevens and Lee, who have flown continuously for the past eight months, made an aggregate of 516 trips with a total of 112,469 miles and with all told only nine forced landings due to engine trouble. This is an average of 12,474 miles for each forced landing for mechanical trouble.

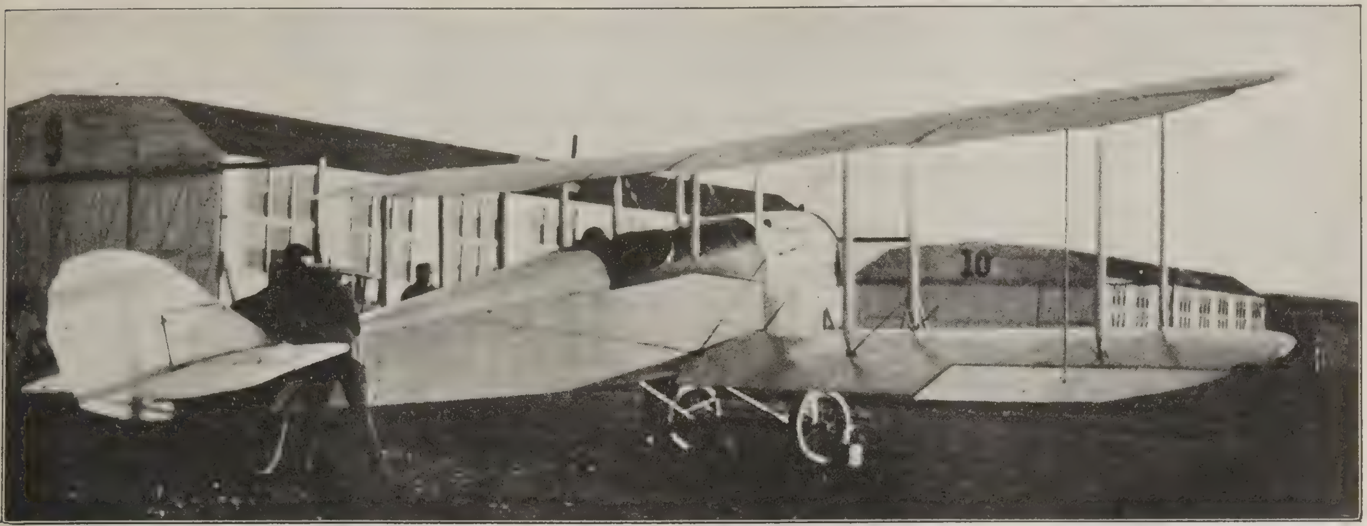
These records were made in the mountain routes between New York and Cleveland, except that of E. H. Lee, who flies between New York and Washington, and the trips are more than 200 miles in length.

The Post Office Department considers this performance of the pilots and mechanics an unusually creditable one because nearly one-half of the flying was done under the trying conditions of the most severe winter that the country has seen in many years. For weeks the flying into and out of the aerial mail field at Newark, N. J., on the New York-Bellefonte and New York-Washington trips had to be performed with planes equipped with snow skids in place of wheels.

Since the recent thaw has set in, the aerial mail planes on the Western fields are being temporarily equipped with four instead of two wheels, which enables the planes to take off and land in the mud with perfect safety.

The following is the standing of the twenty regular mail pilots at the close of flying, February 29, 1920, the rating being based on the per cent of perfect flights made without forced landing of any kind:

Pilots	*Trips Started*	*Trips Completed Without Forced Landings*	*Per Cent.*	*Trips Defaulted*	*Trips Uncompleted*	*Miles Flown*	*Causes of --Forced Landings-- Weather*	*Mechanical*
8 months flying—								
Lewis, H. T.......	90	88	97.77	8	1	18,920	0	2
Miller, Max	90	85	94.44	12	5	19,255	3	2
Knight, J. H......	106	98	92.45	2	6	24,020	7	1
Ellis, R. H.........	74	67	90.54	6	2	18,035	6	1
Stevens, W. H....	79	71	89.87	10	3	16,568	6	2
Lee, E. H.........	77	64	83.11	4	5	15,671	12	1
7 months flying—								
Crader, H. M......	62	54	87.09	17	7	12,588	5	3
Robinson, F. A....	67	57	85.07	6	4	13,600	7	3
Eaton, S. C........	61	45	73.77	6	3	12,327	12	4
6 months flying—								
Riddick, M. K....	62	53	85.48	4	3	13,133	7	2
Miller, J. M.......	58	47	81.03	0	3	18,505	10	1
Leonhardt, E. G...	46	31	67.39	1	8	13,700	14	1
5 months flying—								
Smith, Paul W....	32	25	78.12	6	3	6,281	2	5
Nutter, Farr	31	21	67.74	2	9	8,947	8	2
Smith, W. J.......	31	19	61.29	3	4	9,325	10	2
Oakes, P. S.......	36	21	58.33	5	11	10,000	10	5
Page, R. G........	28	16	57.14	2	5	5,403	10	2
4 months flying—								
Smith, W. L......	43	26	60.45	3	5	8,003	11	6
3 months flying—								
Harris, J. P.......	27	16	59.25	2	5	8,090	9	2
2 months flying—								
Hogue, M. C......	11	6	54.54	0	1	2,065	5	0



THE STINSON "GREYHOUND"

The new Stinson "Greyhound" biplane which Eddie Stinson recently flew from Dayton, Ohio, to Mineola, L. I., is of very interesting design.

The fuselage, which has a two place side by side seating arrangement, is streamlined so that it offers less resistance than the ordinary type. In the rear of the cockpit are compartments for tools. The fuselage is finished in gray, the cowling is mahogany, and the engine hood which is bumped out for the rocker arms to insure effective streamline is natural aluminum. The copper gas tank contains ample fuel supply. Seats are upholstered in deep green velour, making a striking contrast with the mahogany finish of the cockpit.

The U. S. A.-4 wing section is used and is of the five panel type. The ribs are all of three-ply veneer, the compression ribs being of the box type, the others cut out for lightness.

Stick control is used, which operates the ailerons by means of a rocker arm and adjustable spacers working on bell cranks which are fastened to a tube running through the lower wing and forming the leading edge of the lower aileron. The lower aileron is connected to the upper aileron by means of an adjustable steel tubing spacer. This insures positive control in case the ailerons of either wing are disabled.

The elevators are controlled by a single mast, the top arm being in the vertical stabilizer and the lower in the fuselage. The wire trailing edge is carried out on all controls and wings.

The landing gear is of V-type made of steel tubing, having a high factor of safety. It is nickel plated and polished, adding greatly to the appearance of the machine. Shock absorption is carried out in the usual manner, using rubber cord.

The power plant consists of a Curtiss OX-5, 90 H. P. engine, equipped with an electric starter.

The machine is finished excellently, all wires and fittings being nickel-plated and buffed.

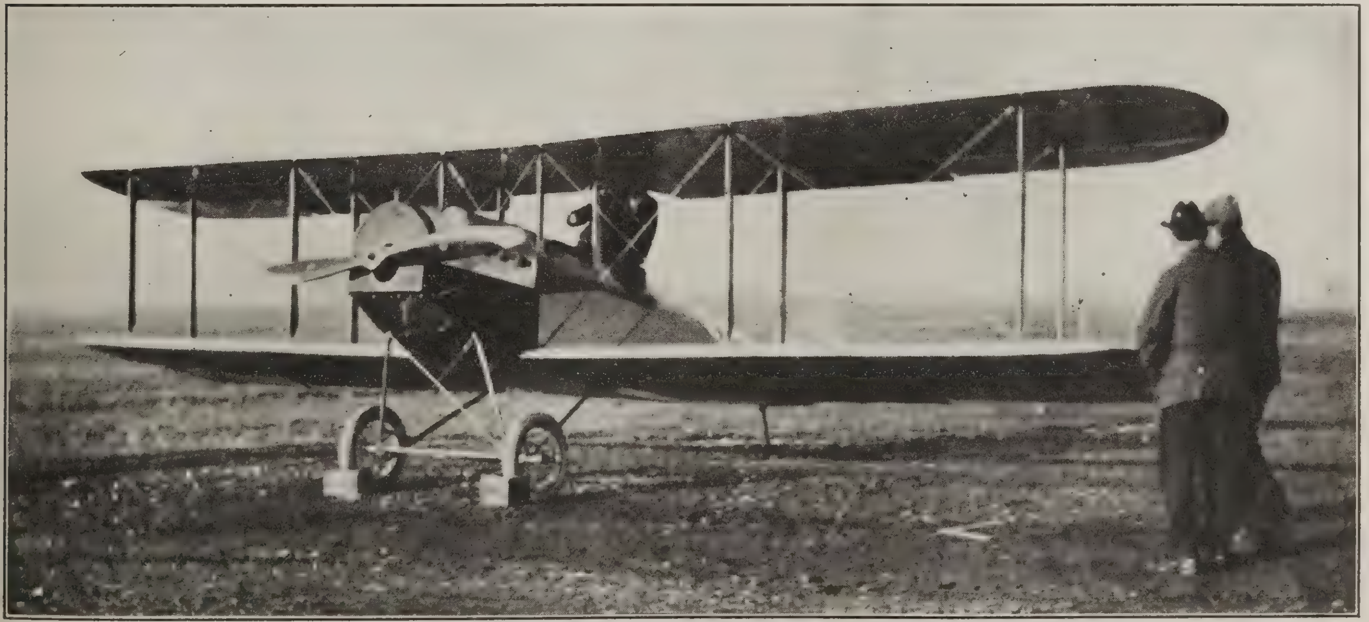
A Hartzell walnut propeller is used with very good results, the performance of the machine exceeding all expectations in speed and climb.

Specifications of Stinson Biplane:

Span	34′ 2¼″
Overall length	22′ 4″
Height	9′ 0″
Gap	5′ 0″
Chord	5′ 0″
Total wing area	320 sq. ft.
Weight, empty	947 lbs.
Weight with pilot, passenger and fuel (including 26 gals. gas)	1492 lbs.
Weight, per square foot	4,66 lbs.
Weight, per horsepower	16.57 lbs.

Performance (actual test):

High speed	96 m. p. hr.
Low landing speed	25 m. p. hr.
Economical speed	55 m. p. hr.
Fuel capacity, full speed	3¼ hrs.
Full capacity, economical speed	5½ hrs.
Climb, first minute	1150 ft.
Power Plant	Curtiss OX-5, 90 H. P. at 1400 R. P. M.



The Stinson "Greyhound" equipped with Curtiss OX Motor

DESCRIPTION OF APPARATUS FOR MEASUREMENT IN A WIND TUNNEL OF THE PERFORMANCE OF AN AIRSCREW OR THE WINDAGE TORQUE OF A ROTARY ENGINE

By A. PAGE, A.R.S.Sc., H. E. COLLINS, and T. H. FEWSTER

The apparatus described in this report was designed to be used with the balance of a 7-foot wind tunnel to measure the performance of a model airscrew when mounted in position on a model of an aeroplane body. The apparatus is equally suitable for the measurement of either the windage torque of a model of a rotary engine or the performance of a combination of a model airscrew and a model of a rotary engine.

A sketch of the apparatus as arranged to measure the windage forces on a model of a rotary engine when rotating behind, and with the same speed as the model airscrew is given in Fig. 1. The airscrew would, of course, occupy the position of the rotary engine if its performance were being measured. The apparatus consists of a 1½ h.p. electric motor (A), bolted to a cradle, to the ends of which are attached two hardened steel points bearing in the cups of the *Y* pieces (M). These *Y* pieces are rigidly connected to the lower ends of the diagonally arranged wires (C), the upper ends of which are supported from the roof of the channel by stirrups carrying hardened steel points bearing in the cups (D). With this method of support the electric motor with either the airscrew or the rotary engine, as the case may be, would be capable, if there were no other constraint, of a swinging motion in the direction of the motor shaft and also of a rocking motion about the axis passing through the points BB, this axis being parallel to, and slightly below the axis of, the shaft. A spindle arm *E* projecting from the under side of the cradle is connected by a strut and "C" spring to the top of a spindle clamped in the top of the trumpet of the channel balance. The spindle arm *E* and the top of the balance trumpet are enclosed in a guard which is cylindrical over the greater part of its length, but of a stream-line shape where surrounding the strut and "C" spring. To avoid any unnecessary constraint of the moving parts of the measuring apparatus, electrical connection between the motor and the mains is made through the standard form of mercury cups (G). A revolution counter (H), driven by the motor shaft and in electrical connection with a bell, enables the rotational speed of the airscrew to be measured. The scale of the models to be used with the apparatus needs to be such that the electric motor with its contiguous parts are completely enclosed in a shell of the model aeroplane body (K) and such as to ensure a sufficient clearance between the surrounding shell and the moving parts of the measuring apparatus. The body surrounding the motor is supported by two iron bars (L) secured at their ends to the walls of the channel.

Measurement of Torque

When measuring torque, the rocking axis BB of the motor and airscrew which is parallel to the airscrew shaft is fixed parallel to the centre line of the channel by rigidly attaching the *Y* pieces to the cross-channel bars (L).

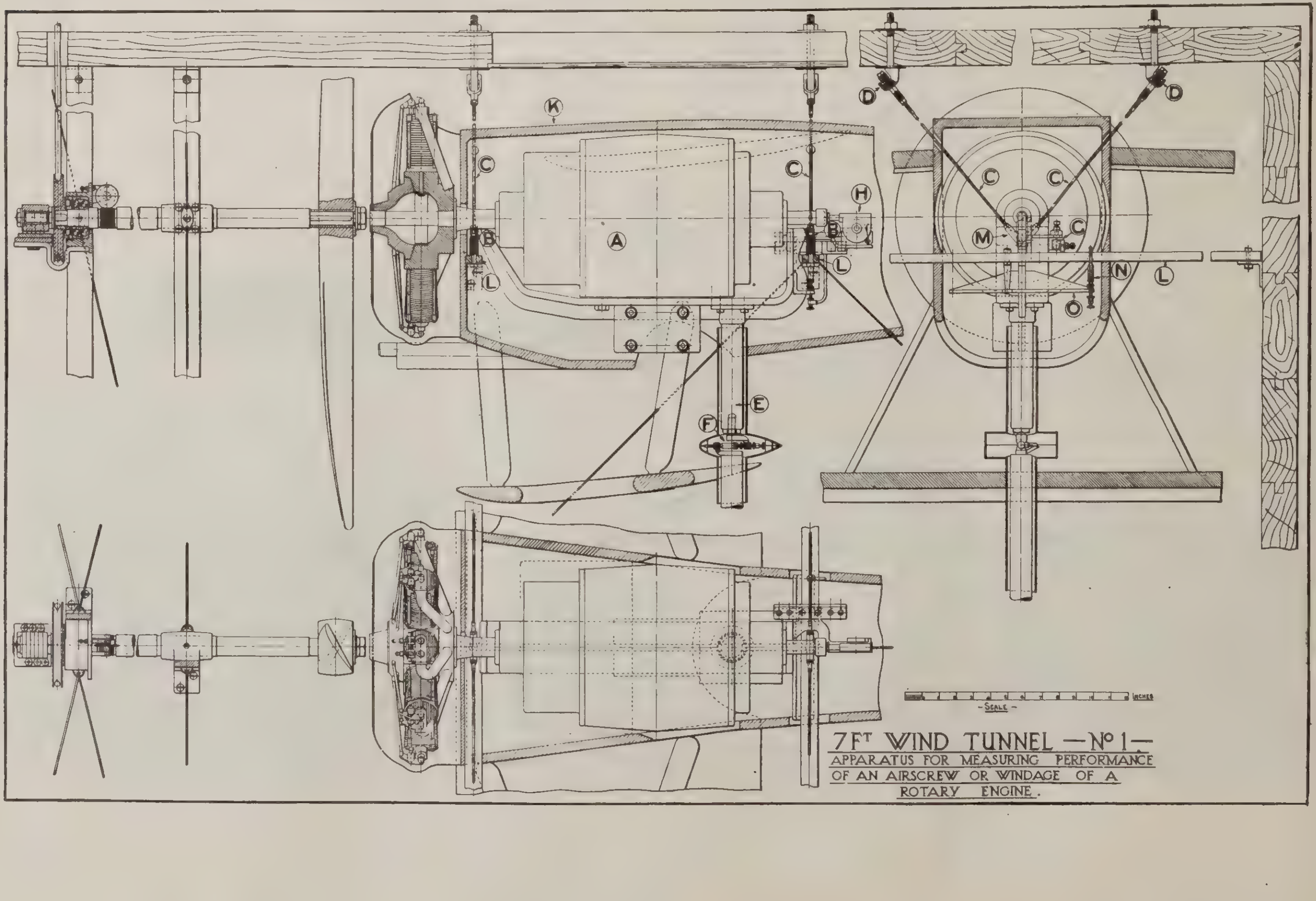
The brackets at the lower end of the arm (E) and at the top of the balance spindle are adjusted so that the strut which transmits the load to the top of the balance is at right angles to the axis of the airscrew shaft. A direct calibration of the apparatus may be made by applying a known torque and weighing directly with the balance.

The distance between the rocking axis BB and the axis of the airscrew and motor is small—about 1 inch—so that a component of the thrust at right angles to the rocking axis due to any want of parallelism between these two axes will affect only slightly the measurement of torque. It was found experimentally that no torque could be measured when a thrust was directly applied along the airscrew shaft. The alignment of the apparatus for the measurement of torque was therefore satisfactory.

Measurement of Thrust

To measure the thrust the *Y* pieces are detached from the fixed bars (L) so that the motor and airscrew have freedom to swing in a longitudinal direction about the points (D) at the upper ends of the wires and the points (B) of the motor cradle. The brackets on the lower end of the arm (E) and the top of the channel spindle are adjusted so that the strut (F) which transmits the thrust load to the top of the balance is parallel to the airscrew axis. A strut (N) which is held in position with a "C" spring, between the bracket (O) of the motor cradle and one of the bars (L), prevents any rocking of the motor about the axis BB. This strut is mounted at right angles to the direction of the thrust so that no force

(*Continued on page* 123)


K
C
A
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SCALE
INCHES
7FT WIND TUNNEL — No 1 —
APPARATUS FOR MEASURING PERFORMANCE
OF AN AIRSCREW OR WINDAGE OF A
ROTARY ENGINE.

FUSELAGE STRESS ANALYSIS

By EDWARD P. WARNER and ROY G. MILLER

Report No. 76, National Advisory Committee for Aeronautics

Introduction

THERE is, at the present time, a wide diversity in the methods employed by designers for analyzing the stresses in a fuselage of the built-up type in which the shear is taken by diagonal bracing wires, and there is a similar diversity of opinion as to the best type of analysis manifested in the standards and specifications issued by various governmental agencies.

In a specification for pursuit machines (No. 1003) issued by the Signal Corps just after the United States entered the war, the requirement is that the fuselage be designed to stand a dynamic load factor of 5 and a tail load of 27 pounds per square foot for machines having a maximum horizontal speed of 100 miles per hour, 38 pounds per square foot where the maximum horizontal speed was 120 miles per hour, and so on for higher or lower speeds, the load per unit of area varying as the square of the speed. For machines making 100 miles per hour this corresponded to a tail load of 5.4 pounds per square foot for each unit of dynamic load. This is very nearly equal to the relation between these two loads now laid down in the Air Service's specifications for fuselage sand load tests, where it is prescribed that the tail load shall be 5 pounds per square foot for each unit of dynamic load. A fuselage should, with this type of loading, stand a dynamic load of at least 4, with 20 pounds per square foot on the tail. The general specifications of the Bureau of Construction and Repair, United States Navy, fix the required tail load at 20 pounds per square foot, but combine with this only the weight of the machine without a dynamic factor.

These specifications relate primarily to flying loads. In studying the distribution of load on landing, also, there is some difference of opinion as to the best method of procedure, although the vexed question of tail loading is avoided in this case. Obviously there are many different ways in which a landing may be effected, and the distribution of the landing loads, as well as their magnitude, will vary with the speed of the machine, its attitude at the instant of touching the ground, the position of the controls, the nature of the ground, and a number of other factors.

The method adopted in this report is, in the main, the straightforward one of choosing a standard type of machine, analyzing it my many different methods, and comparing the results. The loadings for all of the seven cases studied are illustrated in Figures 1 and 2, and the stresses in the members for all the loadings tried are tabulated at the end of the report.

In the tabulation the largest stress occurring in each member has been printed in italics. Where the same member may take tension or compression under different loadings, the maximum stress of each sort is printed in italics. In picking out the maximum, Case VII was ignored for reasons which will be apparent later. In some cases it has been possible to make results clearer by analytical discussion, but the graphical analysis has been carried through in every case. The dynamic factor used is 5 in all cases, this being considered to allow for very heavy landings and also for the worst loads experienced in flying. If the sizes of members were being selected, a further "material factor" or true factor of safety of about 1½ should be allowed over the tabulated stresses (i. e., the ultimate strength of each member should be at least 1½ times the largest stress set down against that member in the table).

If a really thorough and accurate analysis of the stresses in an aeroplane were to be made, it would be necessary to treat the whole structure as a unit instead of separating wings and fuselage as is the invariable custom. The drag wires and other members so interconnect the parts of the machine that no single part can be treated independently with strict accuracy. So many uncertainties arise, however, chiefly due to the presence of redundant members, the stress in which is determined by the rigidity of their end connections and by the initial tension with which they are set up, that it is usually best to consider these redundant inter-connecting members as additional safeguards, and not to take them into consideration in figuring stresses. There are some conditions, however, as will be seen in connection with Case VI, where it would be manifestly absurd to ignore entirely the effect of the external drag wires on the fuselage stresses.

The fuselage adopted is similar to that of the JN4H. The layout of the center lines of the members is identical with that in the JN4H, but the load distribution differs in some particulars from that adopted in the Curtiss design, and the stresses given in the report therefore should not be taken as representing those actually existing in the JN.

Landing Loads

The landing stresses have been examined on four different sets of assumptions, three relating to landings with the tail high, the fourth to those with the tail low (three-point). The lift of the wings has been neglected in all cases. Its inclusion or omission has little effect on any stresses except those in the chassis struts and in the vertical members directly over them. If the weight of the aeroplane be broken up into loads applied at the panel points in the usual manner, and if the sum of these loads be opposed by a vertical force acting at the axle, which is manifestly the only place that it can act until the tail skid touches the ground, the resultant of the loads at the panel points will pass through the center of gravity, while the vertical through the axle will pass well forward of this point. Therefore, although the two resultant forces are equal in magnitude and opposite in direction they are not directly opposed, and their resultant is a turning moment which, if a landing were actually made under these conditions, would whip the tail of the machine violently downward. Actually, however, the force applied at the axle is not vertical, but is inclined backward by the frictional resistance to forward motion. This frictional resistance varies widely with the nature of the ground, but it is common to arbitrarily assume, in order to simplify the analysis that it is just suffi-

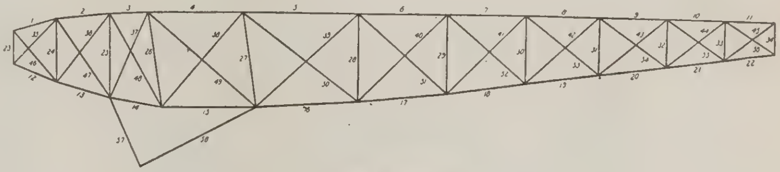

Table of Stresses.

Number.	Case I.	Case II.	Case III.	Case IV.	Case V.	Case VI.	Case VII.
1	+ 200	0	+*1392*	0	+ 17	− *92*	....
2	+1114	+ 580	+*1840*	+ 580	+ 590	+ 44	....
3	+1466	+1195	+*2200*	+ 505	+1553	+ 206	....
4	+1797	+1305	+2123	− *712*	+*2194*	+ 431	....
5	+1420	+1435	+1435	− *425*	+*1519*	+ 757	+4330
6	+1070	+1074	+1074	− *523*	+*1189*	+ 792	+3620
7	+ 837	+ 839	+ 839	− *533*	+ *946*	+ 763	+3063
8	+ 591	+ 606	+ 606	− *533*	+ 709	+ 707	+2470
9	+ 324	+ 358	+ 358	− *488*	+ 446	+ *606*	+1745
10	+ 94	+ 133	+ 133	− *188*	+ 189	+ *429*	+ 918
11	− *29*	0	0	0	+ 5	+ *89*	0
12	− 549	− 625	+ *223*	− 625	− *661*	− 209	....
13	−*1540*	−1513	− 774	−1513	−1531	− 313	....
14	+ 524	−1500	+ *880*	+ 448	−*2375*	− 400	....
15	+1177	−1980	+*1305*	+1133	−*2841*	− 680	....
16	−*2766*	−2343	−2343	− 98	−2430	− 760	−5793
17	−*1683*	−1540	−1540	+ *425*	−1553	− 760	−4355
18	−*1260*	−1086	−1086	+ *528*	−1191	− 746	−3650
19	− *991*	− 849	− 849	+ *493*	− 968	− 709	−3098
20	− 714	− 611	− 611	+ *380*	− *728*	− 648	−2498
21	− 431	− 364	− 364	+ *148*	− *462*	− 543	−1768
22	− 166	− 134	− 134	− 134	− 199	− *355*	− 928
23	− 457	− 450	− 55	− 450	− 447	− *470*	....
24	−1260	−1088	−*1268*	−1088	−1093	− 121	....
25	−3089	−2043	−2740	−*3200*	−1564	− 182	....
26	−1089	− 490	− 944	−1430	−*2587*	− 265	....
27	−1786	−*2363*	−1573	−1278	−1064	− 136	....
28	− *586*	− 511	− 511	− 283	− 503	+ *3*	− 843
29	− *309*	− 273	− 273	− 43	− 260	− 12	− 550
30	− *237*	− 206	− 206	− 23	− 212	− 38	− 495
31	− *220*	− 196	− 196	− 60	− 205	− 64	− 533
32	− *220*	− 194	− 194	− 138	− 215	− 100	− 608
33	− 160	− 141	− 141	− *353*	− 177	− 180	−6438
34	− 77	− 70	− 70	− 70	− 122	− *294*	− 695
35	+ *954*	+ 820	+ 468	+ 820	+ 827	+ 100	....
36	+*1717*	+1456	+1555	+1456	+1492	+ 194	....
37	0	0	0	0	+*1188*	+ 252	....
38	0	+*1045*	0	0	0	+ 337	....
39	0	0	0	0	0	+ *36*	....
40	0	0	0	0	0	0	....
41	0	0	0	0	0	0	....
42	0	0	0	+ *58*	0	0	....
43	0	0	0	+ *145*	0	0	....
44	0	0	0	+ *293*	0	0	....
45	0	0	0	0	0	0	....
46	0	0	0	0	0	0	....
47	0	0	0	0	0	0	....
48	+ 529	+ 585	+1195	+*1860*	0	0	....
49	+ 377	+ 0	+ 288	+*1065*	+ 790	0	....
50	+*1283*	+1134	+1134	+ 655	+1109	0	+1825
51	+ *543*	+ 475	+ 475	+ 130	+ 478	+ 19	+ 950
52	+ *360*	+ 319	+ 319	+ 8	+ 301	+ 45	+ 740
53	+ *337*	+ 300	+ 300	0	+ 305	+ 75	+ 758
54	+ *337*	+ 303	+ 303	0	+ 324	+ 127	+ 893
55	+ 297	+ 273	+ 273	0	+ *311*	+ 220	+1003
56	+ 171	+ 158	+ 158	+ 163	+ 234	+ *408*	+1093
57	−4489	Ind.	−3900	−*4545*	....	....	....
58	−*4629*	Ind.	−4105	−2070	....	....	....

cient to incline the line representing the resultant ground reaction until it passes through the center of gravity. If this assumption be made the two resultant forces (ground reactions and resultant of loads at panel points) no longer give a moment, as they both pass through the center of gravity, but they are no longer directly opposed, and there is an unbalanced horizontal force which must be taken care of in order that complete statical equilibrium of the structure may be secured. The securing of statical equilibrium is, of course, an essential condition for the closure of any stress diagram. The horizontal component of the ground reaction has been treated in two different ways (Cases I and III). In the first, it is assumed that this force is not balanced by any external force, and that the machine is therefore decelerating. The deceleration of the several weights applied at the panel points tends to throw them forward, and the resultant of the weight and the inertia force lies in a line parallel to the resultant ground reaction. Since the vertical component of each force remains unchanged; the load at each point should be multiplied by the secant of the angle through which its line of action is turned by the inertia force. This method of applying landing loads was first suggested and applied by J. A. Roché.[1] The distribution between the upper and lower panel points of the parts of a load is inversely proportional to the distances from the load to the panel points (just like the supporting reactions for a simple beam). This is rigorously correct for the horizontal components, but not for the vertical ones, since the end fixtures of fuselage struts usually will not transmit tension, and vertical loads applied between the ends of the strut are transmitted to the longeron entirely at the lower end of the strut. It was shown in Mr. Roché's article that the maximum stresses are not changed in any member if the vertical and horizontal loads are both divided between the upper and lower panel points in the proportion correct for the horizontal ones, and such an arrangement of loads, making the lines of action of all the forces parallel to each other, greatly simplifies the work. The second method is to balance the horizontal component of ground reaction directly by a thrust load. This is the condition in taxi-ing, and is illustrated in Case III. The assumption that the thrust is large enough to balance completely the horizontal component while the dynamic load is a maximum is rather severe, as the thrust would have to be about equal to the weight of the machine when the dynamic load was 5. The figures obtained on this assumption, however, at least serve to show in which members the stress is increased by a thrust load.

Case II is intended to relate to the same condition as Case I, but in a simplified form making it unnecessary to deal with inclined loads. Instead of taking the reactions at the points of attachment of the chassis struts as passing along the struts, so that their resultant might pass through the axle, the resultant of the panel-point loads is opposed, in Case II, by a vertical force passing through the center of gravity. The forces in the chassis struts are then arbitrarily replaced by two vertical forces acting at the same points and so proportioned that their resultant is the line just spoken of. All external forces are then vertical, there are no inertia forces, and the resultants of the upward and downward forces both pass through the center of gravity and there is complete equilibrium. This is manifestly an easy case to deal with, and the stress diagram in Case II is much simpler than that in Case I, where the external forces can not all be represented on a single straight line. The simplified method has been used by the aeroplane engineering department of the Air Service.

It is evident that the entire omission of the horizontal components of the chassis strut forces will have a considerable effect on the stresses in the longerons in the bays between the points of attachment of the two struts. This is particularly noticeable in a machine like the JN, where the upper ends of the chassis struts are widely separated and their slope is small. An inspection of the tabulation of the results of the analyses shows that the stresses in the top longeron near the rear of the body are greater for Case II, those in the bottom longeron for Case I. This is natural, as the inertia components of the loads, acting from the free end toward the supporting reactions, tend to increase the compression in the lower longeron and counterbalance the tension in the upper one. The stresses in the struts and wires are nearly the same for the two cases except in the bays between the points of attachment of the chassis struts. This, again, is what might be expected, as, the longerons being nearly parallel and horizontal, the primary duty of the wires is to carry the shear due to vertical loads, while the strut compressions are almost exactly equal to the vertical components of the stresses in the adjacent wires. Strut and wire stresses are therefore substantially unaffected by horizontal components of load at the panel points. In no case, except in the bays between the chassis struts and in a few other bays of the top longeron, is the difference of stress in a member for the two cases as much as 5 per cent. The percentage difference is large in some of these cases, but only where the magnitude of the stresses is small and where the factor of safety would be sure to be very large. The simplified method of Case II leads to an overestimation of the top longeron stresses, as compared with Case I, by about 100 pounds in one bay. The important differences come in the bays between chassis struts. The type of loading used in Case II is manifestly wrong for these bays, and the inclusion of the horizontal components of the strut reactions changes the magnitude of the stresses very radically. In the case of the lower longeron, the effect of these components is to change the stress from a large compression to a tension. The difference between the two cases in the upper longeron is much smaller, but the simplified method is not on the safe side. In the struts, the stress given by the simplified method is too high in the member directly over the rear chassis strut, and too low in all others. The only pair of wires much affected is that in the rear bay, where different wires are in tension in the two cases.

Summing up, it is evident that the method of Case II is satisfactory for the rear of the body, but that it gives results very badly in error for some of the members in the neighborhood of the chassis attachment. The simplified loading can well be used for a preliminary analysis to assist in estimating the sizes of members, but it should not be considered as satisfactorily covering the landing loads by itself. When it is employed there should be added to the stresses in the bays of the lower longeron between the chassis struts an amount equal to the horizontal component which would exist in the adjacent chassis strut if the loading of Case I were used. This horizontal component can be found by drawing a triangle of forces. (The addition is algebraic, compressions being taken as negative, and the effect usually is to change the sign of the stresses.)

Case III (ground friction balanced by thrust) gives results identical with those of Case II for all members behind the rear chassis strut. The effect of thrust can be satisfactorily allowed for by adding (algebraically) one-sixth of the weight of the machine to the stress in every bay of each longeron from the nose to the front chassis strut, and one-tenth the weight to the stresses in the longerons between the chassis struts. If the engine is carried in such a way that the thrust can only be transmitted to the fuselage at the rear of the bearers the addition to allow for thrust load can, of course, be omitted forward of this point.

Case IV relates to a three-point landing. The largest dynamic loads usually occur in this type of landing, as a pilot having a forced landing on rough ground will land at as low a speed as possible, and the tail-skid will therefore come into contact with the ground before the shock absorbers on the wheels have had time to extend fully. The only case in which a large dynamic load is likely to occur on a high-speed landing (I and II) is that in which the pilot is unskilled or landing in the dark and fails to flatten out early enough. In considering the landing with tail low all the loads have been taken perpendicular to the top longeron. The effect of friction and of inertia loads is thus allowed for, as the perpendicular to the top longeron makes an angle of about 10° with the true vertical when the machine is resting on the ground. To be strictly accurate, the reactions should be drawn with different inclinations, as the coefficient of friction of the tail-skid is much greater than that of the wheels, but the effect of allowing for this difference would be too small to warrant the additional complication. Since the point of contact of the tail-skid is some distance behind its point of attachment, the reaction of the tail-skid has a moment about its hinge. This is allowed for in the way in which it is actually taken through the hinge and shock-absorber cord in the machine, by putting on equal and opposite horizontal forces at the top and bottom of the strut where the tail-skid is attached. Since the pull in the shock-absorber cord has a vertical component, there should be added another pair of vertical forces, equal and opposite. These have been omitted from the diagram, as their only effect is to increase the compression in the strut over the tail-skid.

The tail-skid load reverses the stresses in the longerons behind the rear chassis strut and changes the diagonal which takes tension in several cases, as compared with the loading arrangements which have already been considered. The stress in the front chassis strut and in the fuselage strut directly opposed to it are also somewhat greater in a three-point than in a two-point landing, because of the backward inclination of the reaction causing the front strut to carry a smaller share of the total load in the latter case than in the former.

The conclusion is that landing stresses should be analyzed

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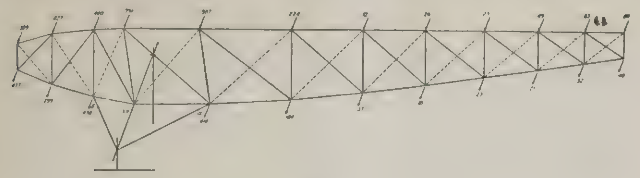
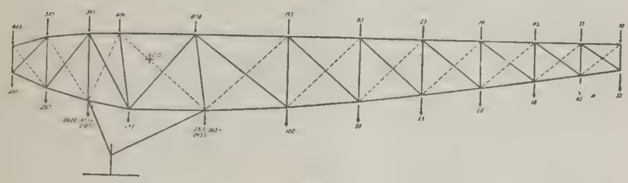
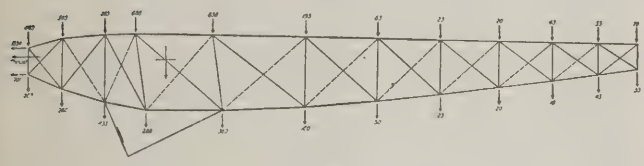
[1] Methods Used in Finding Fuselage Stresses, by J. A. Roché: Aerial Age, July 23, 1917, vol. 5, p. 642.



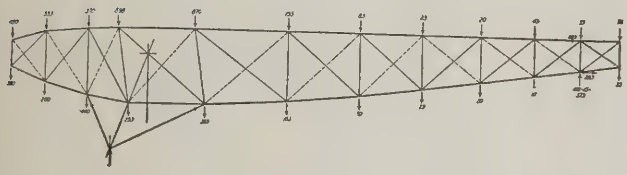
Case I.



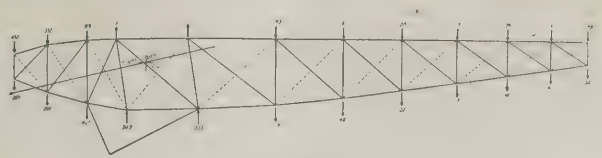
Case II.



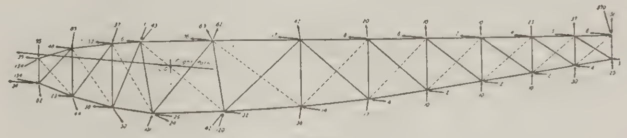
Case III.



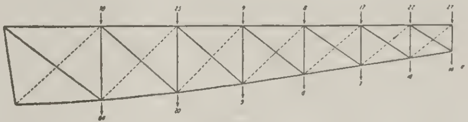
Case IV.
Figure 1.



Case V



Case VI.



Case VII.
Figure 2.

for three-point landings (Case IV) and for two-point landings with inclined ground reaction and inertia loads (Case II) and that allowance should be made for the effect of thrust on the stresses in the forward bays of the longerons, especially the upper one. If only one stress diagram is to be drawn for landing loads it should be for the case with tail-skid reaction, as the analysis for flying conditions is very similar in most particulars to that for a two-point landing, and gives stresses of the same order in the rear of the body, whereas there is no other type of loading which resembles that encountered when landing with tail down closely enough to be substituted for it.

Flying Loads

It is customary, in analyzing the fuselage stresses under flying conditions, to consider only the rear portion of the structure, and to treat this as a cantilever loaded in accordance with some set of assumptions and supported either at the rear wing spars or the lower spars. The first assumption as to the support is the more common, but the United States Navy specifications call for an analysis with the reactions taken at the lower wing hinges, which appears to be more logical.

It is very desirable that the analysis under flying conditions be extended to cover the whole structure, from nose to tail. While this is not possible by an extension of the ordinary method with an arbitrarily fixed tail load, the stress diagram failing to close if it is carried on past the wing hinges to the nose of the aeroplane, a closed diagram can always be secured if full account is taken of all the forces acting on the aeroplane and of its motions under those forces.

The downward loads on an aeroplane fuselage in flight may be divided into dynamic loads and tail loads. The dynamic loads are due to the acceleration of the center of gravity of the machine (usually an acceleration parallel to the normal axis of the machine, arising in flattening out after a dive or in some similar sudden change of course). Since the lines of the action of the dynamic loads on all parts of the machine at a given instant are parallel so long as there is no angular acceleration of the aeroplane about its C. G., and since the dynamic loads at the panel points are proportional to the weights concentrated at those panel points the resultant of these loads always passes through the C. G. of the machine.

The tail load, in turn, may be divided into three parts. First is the load, usually downward, required to give static equilibrium about the C. G. This part of the load usually has, for any particular machine, a maximum value of about 4 per cent of the wing loading, its exact magnitude depending on the position of the center of pressure of the wings with relation to the center of gravity. For tail surfaces of normal size, this gives a unit loading of about one-quarter of the unit wing loading. The second part of the tail load goes to overcome the damping moment (M_q) due to the body, wings, and chassis. This moment is about 18 per cent of the total damping moment due to the action of the air against the pitching aeroplane.[1] The manner of its distribution is uncertain, and in these illustrative examples it was arbitrarily distributed among the various panel points in such a way that the applied forces would sum up to zero, that the sum of their moments about the C. G. would be equal to 18 per cent of the computed total damping moment, and that the loads would be approximately proportional to the distances of their points of application from the C. G. The tail load due to damping appears only when the aeroplane is rotating about its C. G. (with respect to axes fixed relative to the earth). Finally, there may be an excess of tail load above the sum of these two components, and this excess acts to impart an angular acceleration to the aeroplane.

In considering tail load, the component of damping due to the tail (82 per cent of the total) must be subtracted from the apparent load to get the true value of the total force acting. The total tail load in any machine at a given instant is then a function of elevator setting, angle of attack, speed, and angular velocity.

It was just demonstrated that two of the three portions of the tail load can be so balanced as to give static equilibrium, the first by the wing load acting at a certain distance from the center of gravity, the second by properly distributed damping loads at the panel points. To balance the third component, the excess producing angular acceleration, inertia loads must be applied much as in the case of the deceleration when landing, the difference being that in this case the structure is treated for the moment as though it had no motions except one of rotation about the C. G., and the inertia load at each panel point therefore acts perpendicular to the line connecting that panel point with the C. G. The ratio of the inertia load to the static load at any panel point is directly proportional to the distance from the C. G. Since the dynamic loads and each component of the tail load taken separately can be balanced by properly allowing for the accelerations, it is evident that any combination of loads can be so balanced, and that it is possible to draw, for any set of fuselage loads which can occur, a closed stress diagram taking in every member of the fuselage and with the wing reactions applied as they actually are in practise.

The dynamic loads can only attain their maximum value when the angle of attack is large, and it therefore requires a perceptible interval, after the elevator is pulled up to flatten out from a dive, for the lift on the wings to reach its highest point. The total down load on the tail, on the other hand, reaches its maximum instantly, as the down load is largest when the angle of attack is small, when the speed is high, and when the angular velocity and damping moment are small, and all of these conditions are best fulfilled when the aeroplane is diving and the elevator has just been pulled up. It is then evident that the tail loads and dynamic loads can not reach their maximum at the same time, and any analysis based on the assumption of large loads of both types simultaneously applied is unduly severe.

Furthermore, any analysis in which a maximum down load is applied on the tail and balanced only by reactions at the wing hinges is unduly severe. When there is a large tail load there always exists an angular acceleration, and this produces inertia loads which act upwardly on the rear part of the body, directly balancing the tail load. It can not be too strongly emphasized that the structure as a whole will always be in statical equilibrium if the inertia and damping loads are properly applied, and that there is something wrong with any set of loading assumptions which permits of the existence of an unbalanced moment about the center of gravity.

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[1] Third Annual Report of the National Advisory Committee for Aeronautics, p. 335: Washington, 1918.

In connection with the present report the typical fuselage has been analyzed for three different types of flying loads. Cases V and VI were carried through in accordance with the methods just discussed, all inertia loads being included. Case V relates to the maximum dynamic load, Case VI to the maximum tail load. In Case VII an analysis was made for the rear position of the body in accordance with the common assumptions of a dynamic factor of 5, a tail load of 25 pounds per square foot, and the rear of the body acting as a cantilever supported at the rear wing spars.

The fundamental data for Cases V and VI were based on an analysis of the behavior of a JN in a dive and loop, an analysis the most important results of which were published in the Bulletin of the Airplane Engineering Department, United States Army. In connection with the discussion there printed the effect of inertia loads arising from angular acceleration was taken up, but no attempt was made to carry through a complete analysis of the stresses under flying conditions. The assumptions on which that analysis was based were rather too severe, as the maximum dynamic factor by computation was 8.14, whereas it has been shown by accelerometer tests that the dynamic factor seldom rises above 4 and apparently never reaches 4.5. A dynamic factor of 5 was taken as the standard in these illustrative problems, just as for the landing loads, and the computed lifts, tail loads, accelerations, etc., were therefore reduced in the ratio $\frac{5.00}{8.14}$. This procedure is not entirely justifiable, but it gives as good results as can be attained without another complete analysis of a dive.

Case V relates, not to the exact instant of maximum dynamic load, but to the time, 0.42 second after pulling up the elevator, and 0.1 second before the peak of the dynamic load curve is reached, when the angular acceleration is zero. This very much simplifies the analysis by eliminating the "rotative inertia" loads in this case, and has little effect on the total stresses; as the dynamic load at the instant when the angular acceleration disappears is only 4 per cent below its maximum value. The angle of attack of the wings, in this case, was about 12°, and the resultant force on the wings was therefore very nearly perpendicular to the chord. The total lift was divided among the four wing hinges on each side, the lower hinges taking about 85 per cent of the total lift because of the transmission of lift from the upper wing through the inner lift cables to the lower hinges. The distribution between the front and rear hinges depends on the position of the center of pressure. The tail load vector was arbitrarily drawn parallel to that for wing load, although the L/D for the tail is less than that for the wings. The stresses in the fuselage would be very little affected by changing the slope of the tail vector.

The normal tail load for the speed, angle of attack and elevator angle existing at the instant to which Case V relates would be 10 pounds per square foot if there were no angular velocity. The attribution of 82 per cent of the damping moment to the tail and the deduction of the appropriate amount from the tail load reduces this by about 70 per cent, so that the actual tail load corresponding to a dynamic factor of 5 is 2.5 pounds per square foot. This figure would be larger in a machine where the center of gravity was farther forward relative to the wings, but it would never exceed 10 pounds per square foot. No attempt was made to distribute the drag of the body, the whole amount being combined with the wing drag and applied at the hinges. There, again, the procedure is not rigorously correct, as most of the fuselage drag should act at the nose, but the difference between the exact and approximate distribution of fuselage drag would be negligible.

Thrust and torque loads do not appear in any of the analyses under flying loads, as the speed in a limiting dive is so high that there could not be any thrust or very much torque, the propeller tending to operate as a windmill rather than as a propeller. The thrust and torque loads appear in normal flight, and may be important enough to require special analysis in high-powered aeroplanes with engines having a very low weight per horsepower. There is a gyroscopic torque when flattening out from a dive, and this modifies the stresses in the fuselage members lying in horizontal planes, including the longerons, but it will not be considered in this report.

The analysis in Case VI is very complex, as the loads act in every conceivable direction. They divide, in general, into three groups. First are a set of loads due to translational accelerations. These all act along parallel lines, and, since the lift at the instant after the elevator is pulled up is insignificant, their lines of action are very nearly parallel to the flight path, the only acceleration which amounts to anything being the negative acceleration along the path, due to the excess of total drag over the component of gravity along the path. The second group is made up of the inertia loads due to angular accelerations. Since the lines of action of these loads are perpendicular to the lines connecting their respective panel points with the center of gravity, no two of them act in the same direction, and the drawing of a load diagram becomes a rather complicated and tedious operation. Lastly, there are the external loads, due to air pressure, which balance all these inertia loads. The total load on the tail is roughly 31 pounds per square foot, and its component perpendicular to the flight path is approximately equal to the corresponding component of the force on the wings, so that the resultant is, as already noted, parallel to the flight path. The vector of force on the wings at the very small angle of attack existing during the dive (—3½° for this particular machine) is inclined at about 45° to the perpendicular to the chord, and there is therefore a large component of this force which must be taken by the drag bracing. This bracing system has several redundancies, as there are three external drag wires on each side of the fuselage, and there is also a possibility that the drag may be carried through the stagger wires to the lower wing and thence directly to the fuselage at the lower wing hinges. The distribution of the drag between these four alternative routes is necessarily uncertain, depending largely on the initial tension in the several members, but it is absolutely certain that a large share of the drag is transmitted through the external bracing to the nose of the fuselage in a machine which, like the JN, has no stagger wires in the center section. In Case VI it was assumed that 90 per cent of the drag was taken through the external bracing and 10 per cent at the wing hinges, and that the drag taken by the external bracing was divided equally between the upper and lower wires. From the structural standpoint it is desirable to take as much drag as possible through the upper drag wires, as these wires also carry some lift directly to the nose of the fuselage, greatly reducing the stresses in the forward portion and also reducing the stresses in the inner bay of the wing truss.

There is no damping load to be deducted from the tail load in Case VI, as the machine can not acquire an angular velocity instantaneously when the tail is pulled up.

A comparison of the stresses in Cases VI and VII shows that the ordinary method, neglecting all inertia loads, gives stresses far higher than those which can actually prevail, the over-estimation in some cases being as much as 200 per cent.

Examination of the tabulated stresses for the first six cases shows that the maximum stress in most instances occurs in Case IV, V, or VI. The maximum comes in Case I in a few instances, but the stress in Case I never exceeds by more than 20 per cent the maximum among IV, V, or VI. As already noted, a dynamic load factor of 5 in a tail-high landing would be a very rare occurrence. Case III also shows a few maxima, but only in the forward three bays, and these bays can be taken care of by adding in a correction for thrust in the manner explained in the first part of this paper. Cases IV, V, and VI, then, may be considered as furnishing a complete and satisfactory analysis. Furthermore, since the maximum stresses occur in Case VI only in the three rear bays of the fuselage it is sufficient, if the work is to be reduced to a minimum, to start the stress diagram for the condition of maximum tail load at the tail post and carry it through the three or four rearmost bays.

Since the complete analysis of a dive has been carried through for only one machine, it is necessary to make certain assumptions as to the magnitude of the damping moments in order to determine the load distribution analogous to Case V for a new machine. The angle of attack for a dynamic load factor of 5 may be taken as 12°, and the tail load required to balance the moment of the wing load about the C. G. can then be computed. Two pounds per square foot of tail surface should be added to this to allow for damping, and static equilibrium restored by modifying the dynamic loads in the manner already described.

Cases analogous to VI require fewer assumptions, as there is no damping. The total tail load can be determined from a wind tunnel test of a model with the elevators turned up or approximated from the results of such a test on a similar machine. The tail load required to balance the wing moment can be computed as before, the angle of attack being computed for a 45° dive at limiting speed. All the rest of the tail load goes to produce angular acceleration, and is balanced by inertia loads applied in the manner already described. The distribution of the drag will differ in different types of machines, and no definite rules can be laid down, but caution should be exercised not to make the pull in the upper drag

(*Continued on page* 123)

(*Continued from page* 117)

(9) To bring about increased efficiency in the design of aeroplanes especially fitted for the transportation of passengers, mail and merchandise.

(10) To foster the practice of flying by chart and compass and navigating the air entirely by the use of instruments.

To insure extensive participation there will be two classes of entries or contestants, which may be persons of either sex not less than twenty-one years of age. They may be aircraft pilots or not, and may own or rent their aircraft or book passage on aerial transportation lines as passengers. If they are pilots they may enter as such and undertake to pilot their own aircraft throughout the journey and compete for the special prizes offered for the best records made by contestants who make the largest air mileage piloting their own aircraft, in which case they will be designated as "Piloting Entries," provided they are holders of the pilot certificate issued by the national aero clubs of the countries affiliated with the International Aeronautic Federation, under the rules of the Federation.

Entries can be made through aero clubs members of the Federation by national, municipal and civic bodies, chambers of commerce, merchants' associations and commercial organizations, and colleges and firms, as well as by individuals.

The entries would be permitted to use other methods of transportation besides aerial transportation, but the largest prizes would go to those covering the highest percentage of the distance in aircraft, and that would be an inducement to the entries to travel by aircraft as much as possible.

This plan is submitted for your consideration and advice. We shall welcome any suggestions which you may care to make regarding any phase of this plan at your earliest opportunity, as every effort will be made to put this plan into effect as soon as possible.

The important organization work already accomplished by the Aero Club of America and Aerial League of America's Special Commission, which is visiting thirty-two countries organizing the First Aerial Derby Around the World, makes the work of organization comparatively simple from now on. But it is necessary to decide on the preject as soon as possible, so as to give ample time to manufacturers and aero clubs and organizations to construct special aircraft and select their teams to participate in the three contests each year.

There are approximately 100 aerial transportation lines being established all over the world, and if a decision is reached in the immediate future these transportation lines will modify their plans of organization and change their routes, if necessary, so as to cover different legs of the route of the Aerial Derby, to be ready for those non-piloting participants in the derbies who wish to book their passage on established airways instead of acquiring their own aircraft.

It is quite possible that within a year there will be dirigible, seaplane and land aeroplane lines established throughout the world. We are almost assured of an aeroplane line across the United States, and an airship line across the Atlantic. Air lines are already running across England, France, Italy and Belgium, and other lines are now being established from Europe to Africa and India and Australia.

An air line is now being established from Japan to China. In other words, within six months one can fly around the world excepting for the Pacific. Plans are, however, under way for establishing a trans-Pacific air line.

In sending us your opinion, kindly also advise to what extent your organization expects to be able to participate in these three Aerial Derbies and whether if this program is put into effect within a year your organization would find it possible to make an entry for one or more of these derbies and whether the possibilities are that your first entry would be a piloting entry or a passenger entry.

We are sending a similar inquiry to aero clubs, automobile clubs, chambers of commerce, large manufacturing establishments, and banking, shipping and transportation organizations throughout the world, so as to get world-wide opinion regarding this plan as well as to ascertain the extent approximately of the number of non-piloting entries, as we are sure that a number of aerial transportation lines will be established in the immediate future if there is a possibility of a fairly large number of passengers participating in these contests.

Thanking you for giving this very important matter your earliest consideration and trusting that you will not hesitate to give your fullest opinion, we remain,

Yours very cordially,
THE AERO CLUB OF AMERICA,
AUGUSTUS POST,
Secretary.

P. S.—These three important events will be discussed at the Third Pan-American Aeronautic Convention and Congress, which is to be held at Atlantic City, May 20th to May 30th, 1920, which you and AERIAL AGE readers are cordially invited to attend or send representatives.

(*Continued from page* 122)

wires too large, as the apparent stresses are reduced by so doing. It is better to keep on the safe side and take an excessive proportion of the drag in the lower wires and at the wing hinges.

These notes on loading also furnish some suggestions for the making of sand load tests on fuselages. It is evident that a load of 20 pounds per square foot on the tail, whether or not it is accompanied by a dynamic load, produces larger stresses than would be experienced in practice, and a sand load for maximum tail load would correspond more nearly to actual conditions if upward loads were applied by ropes passing over pulleys and attached at the panel points, to represent the effect of "rotative inertia." If a single sand load test is to be made, however, it would be better to have the loading correspond to the conditions of Case V, with some increase in the tail load to bring the stresses in the rear bays nearer to the maxima found in Case VI. The specifications would then be:

Tail load of 12 pounds per square foot corresponding to a dynamic load of 5, these loads being increased in the same proportion until failure. (These loads are for a training machine. For aeroplanes having a normal wing loading of over 6 pounds per square foot, the tail load corresponding to a dynamic factor of 5 should be increased, reaching a maximum of 18 pounds per square foot when the normal wing loading is 10 pounds per square foot.)

The loads at panel points not to be exactly equal to the product of the dynamic factor by the weight concentrated at the panel point, but to be increased forward of the center of gravity and reduced behind the C. G. to allow for damping effect on the body and appendages (not including the tail unit). The percentage of increase or reduction should be proportional to the horizontal distance from the C. G. to the point of application of the load, and the total moment about the C. G. of these changes of load should be such that, when the fuselage is supported at the lower wing hinges, the supporting reactions will be in inverse proportion to the distances from the hinges to the center of pressure of the wings at an angle of attack of 12°. This will do away with the difficulty now experienced when a large tail load is applied in a sand load test without any allowance for damping or inertia loads. The fuselage tends to pivot about the rear support, and it is necessary arbitrarily to add a large concentrated load at the extreme nose in order to prevent local failure at the rear support.

(*Continued from page* 118)

component of the torque enters into the measurement of the thrust and no constraint to small longitudinal oscillations of the motor is introduced. The calibration of the thrust measuring apparatus may be obtained by applying a known thrust along the airscrew axes and measuring directly on the airscrew balance.

Apparatus for Rotating an Airscrew on an Independent Shaft

It is often necessary, such as when measuring the extra resistance of an aeroplane body due to the working of the airscrew, to mount the airscrew on an independent shaft. A sketch of an apparatus designed for such a purpose is given in Fig. 1. The airscrew shaft which runs in two gunmetal bearings rigidly attached to the channel with bars and tie wires, is driven through leather belting from a motor mounted on the top of the channel. The speed of the airscrew is measured with the aid of a worm wheel and a worm on the airscrew shaft, which is in electrical connection with a bell. A speed indicator consisting of an electrical frequency meter connected to commutators mounted on the end of the airscrew shaft is used when a constant rotational speed is desirable, the speed regulation being made with an adjustable resistance in the armature circuit of the motor. (See R. & M. 371.) The interference of this apparatus on the performance of an airscrew is very small.

As far as the measurements of thrust and torque are concerned the present apparatus was found to be very satisfactory. The scale of the models is, however, large in order that the electric motor—diameter about 10 inches—may be completely enclosed in the shell of the aeroplane body, and accordingly the wind velocity as measured near the mouth of the channel needs to be corrected for the inflow velocity of the air due to the working of the airscrew. The scale of the models could, however, be reduced by mounting a motor specially designed to have a long armature of small diameter.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressoinal Committees find it hard to make an adequate report of the situation in less than two hundred printed pages. Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigation Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his* 1918 *investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

American Aircraft Production—A Close Corporation

Many witnesses desired to testify regarding refusals to receive encouragement from the Army aircraft production officials for inventions whose practicability they declared had been demonstrated. Several witnesses were heard on the subject, all of whom contended that War Department officials were a close corporation, manifesting little interest in aircraft inventions or demonstrations not directly controlled by a small coterie of officers. While this subject undoubtedly has two sides that could not be heard by your committee, we believe that any recognized invitation to inventors generally or an apportionment of a small part of the $1,000,000,000 aviation fund to testing new discoveries and inventions would have been a profitable investment for our country.

No stronger illustration of the stupidity of responsible Army airplane production officers need be offered than testimony of C. M. Keys, vice-president of the Curtiss Co., that employed 18,000 men and produced $87,000,000 worth of aeronautical material (p. 3453):

> Mr. Magee. Was it your contention that if your engineers had been given a free hand that you could have designed and constructed efficient aeroplanes for service at the front?
>
> Mr. Keys. There is no doubt in the world about that. We could have designed pursuit planes, bombing planes, observation planes—any types desired.
>
> Mr. Magee. But you were not permitted to do that?
>
> Mr. Keys. We were not permitted to do it for the Army. . . . The Navy permitted us, and we furnished them. . . . I don't want to be critical in regard to the Army. It was a very ghastly mistake.

Airplane Spruce Production Responsibility

In May, 1917, immediately after our entry into the war, the Aircraft Production Board was created by the Council of National Defense, of which Secretary Baker was chairman.

The board was headed by Howard E. Coffin, vice-president of the Hudson Motor Car Co., and Edward A. Deeds, of Dayton, Ohio, soon became the active man in charge of the equipment division.

Prior to our entry into the war the Governments of Great Britain, France, and Italy were receiving a small amount of spruce from private agencies and brokers in the United States. In June, 1917, Mr. Charles A. Sligh, a large furniture manufacturer of Grand Rapids, was asked by Chairman Coffin to take charge of the work, which included fixing grades and prices that the Government would pay for finished aeroplane lumber. An international conference, so called, was held in Washington, which was attended by representatives from France, England and Italy, and from the Forestry and Engineering Departments and by lumbermen from the Pacific coast (p. 575).

After a conference of several days a price was fixed of $105 per thousand for No. 1 quality of spruce and $55 for fir, with a maximum price for spruce wing beams of $150 per thousand.

A practical illustration of quantity used for aeroplane construction is given in the testimony, wherein it was stated that from 500 to 600 feet of finished lumber was sufficient to build a Curtiss training plane, while 800 feet for a Spad and up to 2,000 feet for a large bombing plane was required.

Russell Hawkins, of Portland, Ore., one of the large loggers and lumbermen of the Pacific coast, was aiding Maj. Sligh in production. Mr. Hawkins had been warmly recommended by Col. Kelly, who was in charge of American lumbering operations in France.

This committee believes that Maj. Sligh was a conscientious, hard-working official with much executive ability, but his powers were extremely limited, and he was handicapped by jealous and selfish interests, including those who desired no restrictions upon their own activities, so that a change in the system of production was decided upon, with the approval of Secretary Baker, in the fall of 1917. Russell Hawkins, an experienced lumberman of recognized executive ability, was at first proposed to take charge, but Col. Brice P. Disque was suddenly sent out from Washington, about October 15, 1917, to look over conditions and report.

Col. Disque in Charge of Spruce Production

Col. Disque had been a Cavalry captain in the Regular Army, and resigned late in January, 1917, after 19 years of service, leaving the Philippines, where he was then stationed, and going to Michigan, where he took charge of the Michigan Penitentiary (p. 1358). He resigned his position as warden in September, 1917, when he was made a lieutenant-colonel, and came to Washington in October of that year.

Col. Disque had "not the slightest" experience in logging or lumbering (p. 1364), and apparently did not know the difference between a spruce tree and a fir. He went to Portland in October, 1917, spending about a week there, and then returned to Washington. He then returned to Portland, relieving Mr. Hawkins, while Maj. Leadbetter, of Portland, was sent to Washington to relieve Maj. Sligh and to act as "liaison officer." Col. Disque disclaimed any connection with Leadbetter prior to the latter's appointment, but subsequent correspondence and telegrams show that they were very intimate later and that Maj. Leadbetter at Washington was used to further the schemes thereafter carried into force.

No Knowledge of Business Required

Like Col. Deeds, who was given charge of aircraft production early in 1917, with no knowledge of the business, with no public record of accomplishment, and no one to vouch for his appointment, Col. Disque, without the slightest knowledge of the business, without any record beyond the handling of Filipinos in Manila and of convicts in Michigan, without anyone to stand sponsor for his appointment and powers granted, took charge of spruce production in a district that had scores of able loggers and lumbermen of tried executive ability and high business standing like Kelly, Pendleton, Hawkins and many others who could have been named.

A remarkable situation occurred at Washington prior to Col. Disque taking charge at Portland, which Maj. Leadbetter, writing Mr. Howe, of the Aircraft Board, on January 4, 1917, described (pp. 1410-1411):

> Col. Disque was instructed to take up the matter from a labor standpoint with Mr. Samuel Gompers. This was done, and in a final interview the matter was settled in a way satisfactory to Mr. Gompers and his assistants. Mr. Gompers then requested that Col Disque and the writer accompany him to the Secretary of War's office where the Secretary of War approved of the general understanding and told Col. Disque to report to Gen. Bliss, Chief of Staff. . . . Col. Disque went West with this view of the situation. . . . Col. Disque met Gen. Squire in Portland . . . who told Disque that he would organize a complete department in Portland . . . and that he would increase his force to the maximum contemplated. Col Disque came on East to get direct instructions from the Chief of Staff for this purpose. These he secured before Gen. Bliss left for Europe, and he . . . returned to the West. . . . The fact that he (Disque) was in close touch with Gompers, Mr. Morrison, Mr. Hamilton, and Mr. Gompers' other assistants and Assistant Secretary of Labor Post . . . goes to prove that no other man could have the confidence of these people that he has. The other method by which these soldiers who are going into the woods should be paid must, of course, be carried out . . . (p. 1410).

Maj. Ray's report comments on this unprecedented proposition, which included a guaranty of an eight-hour day and civilian pay for an army of soldiers to be assembled at Portland.

Probably no arrangement of equal significance was ever had in this country during war as this one, wherein the Secretary of War agreed with Mr. Gompers and Col. Disque to farm out Americn soldiers in the woods and mills of Oregon and Washington, and to build railways for private contractors, to work eight-hour shifts in safe places, and at civilian wages, reaching as high as $8 per day, while American soldiers in France, without limit as to hours, sometimes continuously day and night, were working and fighting at $30 per month.

(*To be continued*)

NAVAL and MILITARY AERONAUTICS

Test of DH-4-B's Prove Satisfactory

The first consignment of DH-4-B aeroplanes was received during the past week by the 12th Aero Squadron at El Paso, Texas. A test flight was made from El Paso, Texas to Douglas, Arizona much to the satisfaction of the pilots of this squadron. They found this plane to be much better adapted to the Border Patrol work as the pilot has a much better range of visibility besides being able to converse with the Observer, an act impossible to perform with the unmodified DH-4.

Fourth Observation Squadron Arrives at Luke Field

The Fourth Observation Squadron from Mitchel Field, with the following complement of officers: Lieutenants Young Johnson, Gale, Duncan, Johnston, Hynes, Banfill, Elliott and Manzelman (Lieutenant Young in command) arrived at Luke Field during the past week. Other officers to arrives at the same time include: Lieutenant Searle from Kelly Field and Lieutenants Gowans, Curtis, Rice, Rabenstein, Seifert, Brooks, Foster and Olssen from Rockwell Field.

Air Service Working with Infantry

Maj.-Gen. Charles P. Menoher, Director of Army Air Service, has perfected plans for the dispatch of an aero squadron and a balloon squadron to Camp Benning, Columbus, Ga., where the squadrons will coordinate their duties in connection with the infantry schools at that camp. General Menoher recently visited Camp Benning, and after a thorough investigation concluded that aviation could be made a valuable adjunct to the camp and schools. In this same connection squadrons will be ordered to other localities for similar duties, and for this reason it will be a matter of about two months before the final arrangements are completed.

U. S. Erecting Coast Aerial Base

An aerial coast defense station is being built for the Army Air Service at New Dorp, Staten Island.

The new station covers approximately 450 acres, with a frontage on the ocean of 1,750 feet. The station is to be a permanent unit in the aerial defense of the nation.

Work has commenced on the hangars and the pier. The pier, together with a concrete ramp at the other end of the beach, will form a haven for seaplanes and flying boats.

The new station has been named Miller Field, in honor of Captain James E. Miller, who was killed in action near Corbeny, France, March 8, 1918. Captain Miller was a member of the 95th Aero Squadron.

Miller Field will be complete in every particular. A wireless transmitting station and a separate wireless receiving station will be erected. Directional wireless apparatus will be installed to guide aircraft in coastal patrol in foggy weather.

The landing ground has facilities for landing in any direction, and is rectangular in shape, providing a runway of 3,200 feet in one direction and 1,625 feet in the other.

Pack Type Parachute Successful In Drag Jump at McCook Field.

Recently seven live parachute jumps were made at McCook Field, at Dayton, Ohio, with the new pack type chute developed by the Equipment Section of the Air Service at Dayton, Ohio. Heretofore it has been customary to release the chute after jumping clear of the aeroplane. All tests made by the pack-type chute have proven successful. The Martin Bomber was used with the tests and for the first test was sent up 2000 feet. Each jumper while in his place on the aeroplane allowed the parachute to open first and then drag him off of the machine. In some of the tests jumps were made as low as 1000 feet proving the entire practicability of using the pack-type chute either in jumping direct or being dragged off of the wings as well as making close to the ground jumps.

Air Service Field Named in Honor of Major Dana H. Crissy

The Adjutant General of the Army has granted authority to name the new field at San Francisco "Crissy Field," in honor of Major Dana H. Crissy, who lost his life in line of duty while participating in the transcontinental flight on October 8, 1919, at Salt Lake City, Utah. Major Crissy was born in Michigan. He was a graduate of West Point, and a captain in the Coast Artillery Corps.

New Radio Trucks Will Soon Be Given Trials

The new radio operating trucks being manufactured by the Mulholland Company of Dunkirk, New York, are well on toward completion.

The radio trucks were patterned after the models used by the British. The body is totally inclosed and room is provided for three operators and one squadron radio officer. One bench supports a ground radio telephone set, one crystal detector receiving set and one low frequency amplifier. Storage batteries are held in clamps underneath the bench. A continuous wave radio telegraph transmitting and receiving set is installed on another bench. A desk for the officer is installed with a battery compartment underneath. A 6-volt circuit, comprising two lamps, is connected to storage batteries.

The ground radio telephone set will be replaced with a higher powered telephone set, which will increase two-way telephone communication to a distance of approximately fifty miles.

The radio telephone set will have a transmitting range of approximately fifteen miles under ordinary conditions for work from ground to aeroplane and vice versa. The transmitting range of the continuous wave set is in the neighborhood of fifty miles. The receiving ranges will depend upon the local conditions and upon the power of the transmitting set whose signals are being received.

Rickenbacker's Spad at Chanute Field

The storage depot at Chanute Field, Rantoul, Illinois, recently received Captain Eddie Rickenbacker's famous Spad which he used over the lines against the Boche with so much success. It is needless to say that this little machine has caused intense interest among the officers at this post. The orders are that this ship is to be placed in storage. The little Spad is considerably the worse physically for its journey from France to say nothing of its encounters with the enemy, which are vividly indicated by the numerous little crosses marking the bullet holes.

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Professor David Todd, of Amherst University, and Major A. Leo Stevens, of Fort Omaha Balloon School, who are planning high altitude flights for astronomical, meteorological and pathological observations.

FOREIGN NEWS

Aerial Lighthouse at Lille

The British Air Ministry has issued the following notice to airmen:

"In order to assist pilots flying on the route from France to Belgium via Valenciennes, a flashing lighthouse has been installed at Lille aerodrome, which is situated two miles southeast of Lille in approximately lat. 50-37 N., long. 13-6 E. of Greenwich.

"The lighthouse is in operation every evening from sunset to 8:30 p.m., and later if required. The signal flashed is a Morse code letter A (dot dash) every eight seconds."

A New London-Paris Service

The new London-Paris Air Service, organized by the Compagnie Grands Express Aeriens with Farman "Goliaths," was inaugurated when a "Goliath" left Le Bourget with a large number of important people on board, including M. P. E. Flandrin, the French Air Minister, M. A. Borrel, the Under Secretary of State for Hydraulic Power, Colonel Saconay, Director of the S.N.A.e., etc. The machine landed at Lympne.

The "Goliath" left Hounslow at 2:30 p.m. on March 8, with M. Flandin and six other passengers on board. A landing was made at Le Bourget at 5:30 p.m. A violent snowstorm was encountered on the French coast.

Nice to London in 9½ Hours

A fine performance was made by the Airco 4 (Rolls-Royce) belonging to Messrs. Instone and Co. recently. Leaving Nice at 6:20 a.m. (G.M.T.), the machine, piloted by Mr. F. L. Barnard, with Mr. H. W. Chattaway and Mr. Alfred du Cros as passengers, flew to Lyons in 2 hrs. 35 mins., the direct route being taken over the Alpes Maritimes. After a stop of about an hour, the machine completed the stage to Paris in 2 hrs. 25 mins., while the third portion of the journey to London took 2 hrs. 7 mins., the machine landing at Hounslow at 3.50 p.m. The flying time for the 900 miles was 7 hrs. 7 mins.

A London-Nice Route

The LepAerial Travel Bureau of Piccadilly Circus have completed arrangements for the avoidance of 12 hours' tedious traveling on the London-Nice route.

The journey from London to Paris is made by Airco aeroplane, and from Paris is continued by sleeping-car express to Avignon. At Avignon a change is again made, and an aeroplane, owned by the Compagnie Aérienne Française, flies to Nice in 1½ hours. About six hours is saved on this section of the journey alone.

Leaving London by this route at 3.00 p.m., the passengers arrive in Nice before 10 a.m. the next day. The fare, which is subject to the variation of the French exchange, is roughly £34.

Japanese Establishing Air Service

The Japanese Army has purchased a few hundred of the latest type aeroplanes from the French Government, and has selected numbers of the French Aviation Mission who were on the front during the war as instructors, about 20 pilots and 20 mechanics and 5 observation officers comprising the mission.

The Imperial Air Service is now under direct control of the Japanese Government, and a regular aviation school has been established at Tokorozawa, near Tokio. A number of other schools are also being established at different places. Major-General Inouye is the head of the Imperial Army Air Service and Major-General Arikawa is the chief commanding officer.

At all the Japanese aviation schools the army student flyers are first trained in Maurice Farman aeroplanes, and put on Sopwith machines for advanced training. After finishing the entire course, stunt flying will be taught by the French instructors. Cross-country and formation flights are now made every day.

The Japanese Navy has also bought a large number of seaplanes from the French. Farman machines are used for preliminary work and advance training is taught on Short (English make), Salmson, Duperdussen, Sopwith, Nieuport and Curtiss planes.

Fliers' Reserve Corps

Paris.—The French Government is determined to maintain a reserve of aeroplane pilots. Several flying schools have been approved to which are to be sent each year a large number of student fliers.

Churchill Proposes to Guard Mesopotamia by Aerial Patrol

London.—Winston Spencer Churchill, Secretary for War, in discussing the army estimates in the House of Commons recently, said of affairs in the Middle East that it was still necessary to hold strong forces there, but he was hopeful of effecting great economies during the course of the year by guarding Mesopotamia primarily through the agency of the air rather than by military forces.

Avro Trials Satisfactory

London.—Trials of a new model Avro triplane, fitted with a Beardmore engine of 160 h.p., have been completed satisfactorily at Hamble. The machine is said to have a low gasoline consumption, making a cruising speed of 80 m.p.h., about nine miles to the gallon of gas. A roomy and comfortable cabin has been fitted inside the fuselage, containing four seats, two facing each way. By removing the seats 113 cu. ft. of baggage space is obtained.

Plan Network of Aerial Routes in France

Figures in possession of the French Aviation Ministry show that between the months of May and November, 1919, three aerial routes were established and operated, apart from irregular flights. These were between Paris and London, Paris and Lille, and Toulouse and Rabat, Morocco. It was announced that the Under Secretary for Aviation is planning a wide network of aerial routes across France and to the African colonies, as well as to England, Spain and Italy.

French Aviation Missions Abroad

Two categories of aviation missions have been sent by the French Government to foreign nations. The first is for propaganda purposes in order to popularize French products abroad. The second is purely military and is sent abroad to assist in the formation of aerial arms in allied armies.

There are six propaganda missions disposed as follows:—

Argentine.—Sent in Sept., 1919, with aeroplanes and seaplanes. Mission under Commandmant de Precardin. Will shortly return.

Brazil.—Sent in Feb., 1919, at request of Brazilian Government to organize Brazilian civil aviation to form flying schools and open aerial traffic lines. Commanded by Capt. Magnier. Returns in 1921.

Japan.—To organize Japanese civil aviation. General Nagaoka is now in Europe with £80,000,000 to spend in the purchase of aircraft. Under Colonel Faure.

Peru.—At the request of Peruvian Government to advise in civil aviation matters.

Spain.—Commanded by Commandant Hormant it has with it Fronval and de Romanet. Returns shortly.

Turkey.—Is running aerial lines in Turkey, Greece, Palestine, Armenia, South Russia, Roumania. Under Colonel de Joys.

The four Military Missions are in:—

Czecho-Slovakia.—Under Commandant Bordage. Charged with the organization of military aviation in that country.

Finland.—Under Captain Etienne.

Poland.—Is creating an air service. Commanded by Commandant de Vergnette.

Siberia.—Under Commandant Voisin. Preserves liaison between Vladivostok and Omsk Government.

A Balloon Entry from Italy

The Roma Aero Club has entered a balloon of 2,500 c.m. capacity for the American Gordon Bennett competition, the gasbag to be controlled by the virtuosi Majors Leone and Valle.

A Proposed Rome-Antwerp Flight

It is proposed to get up a flight of some kind not yet settled from Rome to Antwerp on the occasion of the Games. The Italian Aero Club has sanctioned some affair of the sort to glorify the event.

Flight to Java by Dutch Aviators

Lieutenant Backer and Lieutenant Palther, the Dutch aviators, are going to attempt to fly from Amsterdam to Batavia, Java, for a prize offered by the Dutch Government.

Czecho-Slovakia

The Bohemian firm "Aero" has put its first machines through the Government tests, and so obtained the contract for furnishing the mounts of Czecho-Slovakia's Air Force.

Inspection Flight Made in Egypt

Sir Lee Stack, the Sirdar, made an inspection flight recently in a Vickers "Vimy" bomber. He visited Dueim, Sennar, Makwar and Jebelein. The voyage lasted 7 hr. 20 min. instead of three days

The Handley Page in Scandinavia

The recent demonstration flights of the Handley Page aeroplane in Scandinavia has roused considerable enthusiasm for aviation in that country, and much aerial activity is anticipated in the near future.

Owing to the lack of development of the railway system, there is great scope for aeroplanes and flying boats to link up the large number of coastal towns and those in the interior which have practically no railway facilities at all. Most towns on the coast have to depend on steamers or road vehicles as methods of transport, and some northern localities cannot be reached from the interior under four days. An aeroplane could reduce such journeys to a few hours.

The Handley Page machine, which was piloted by Captain Stewart and Captain Gran, gave exhibition flights at Copenhagen, Aarhus and Christiania, where 454 passengers were given flights.

Civil Aviation in Holland

There are in Holland two companies busy with the construction of aeroplanes. The Spyker-Trompenburg Co., motor and aeroplane constructors, is about to establish an aerial line between Holland, Germany and Scandinavia. The other company, the Nederlandsche Vliectuicabriek Co., is under the direction of Fokker, and intends to open a route along the following line:—Flushing-Rotterdam, The Hague-Amsterdam-Groningen-Flushing-Bois-le-Duc-Arnheim and thence to Germany, and another line between Amsterdam, Utrecht, Arnheim and Maestricht, to link up with the south.

The New President of the French Aero Club

M. Andró Michelin was elected recently President of the French Aero Club. In the evening a banquet was given in his honor, and in his speech he outlined the good work and support which M. Deutsch de la Meurthe had given to aviation in general.

In outlining the work of the future he mentioned that M. Bóchereau had fertile ideas of a 50,000-h.p. machine. What seemed like a novel or a dream would be fact when in years to come the normal height for flying would be 10,000 metres and 400 kilos per hour would be the usual speed of travel. The Aero Club of France would have to become a sort of society of encouragement and propaganda to propagate the faith of the general public and to open up the huge possibilities of aviation in commerce and also in self-defense.

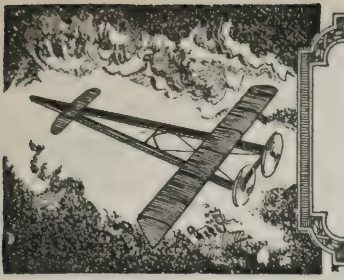
M. Flandin gave a short *exposé* of the government intentions for this year and the next, and laid great emphasis on the necessity of combating the crisis of lack of confidence which is paralyzing aviation at present, and said that the government would do everything possible to collaborate with constructors and transport companies in establishing a definite programme in assuring that financial aid would be available.

The government proposes to ask for definite types of machines, and select among the competitive designs, at least two of each type for construction. These experimental machines would be paid for at an officially high price to make it worth the manufacturers' while. In fixing this price, the government would take over the manufacturing rights for machines which passed their test. The government is arranging during this year, to establish a complete network of aerial lines which will cover 3,600 kilometers in France, and 6,000 kms. in the colonies.

The subsidy arrangement will be continued this year, but may be changed in view of a definite line of action being laid down for next year.

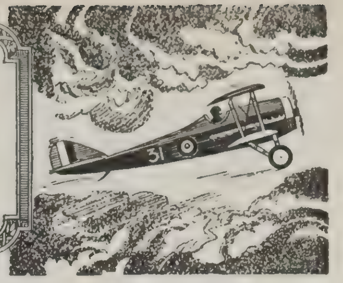
In any case, M. Flandin said he could assure the transport companies that they would be able to pay their way.

As far as possible, the transport company taking up a definite route would have the entire operation of it, providing they gave an efficient service.



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon



Wing Profiles

Of late I have been describing models with solid ribs having a standard tested wing curve.

Many readers have written to me asking for the data in conjunction with these curves, and as it is impossible to send this data to every one I am giving it on this page so that every reader can get the specifications.

The chart shows six well known and mostly used U. S. A. wing curves. Each can be used for a different purpose. The U. S. A. No. 1 for a fast machine. The No. 4 for heavy, slow flying machines.

By referring to the list following, the lift and drift can be figured for each wing curve at each angle of incidence, at any speed in miles per hour.

I have explained how to figure the lift and drift of wings so will not go into detail regarding this now, but will explain how to use the measurements in the accompanying cut.

For instance refer to U. S. A. No. 1. The profile is divided into stations and each station is a per cent of the chord.

Reading from left to right the first and second stations are .0125% of the chord. The third, fourth and fifth are .025% and the remainder .10% or 1/10th of the chord.

Now the whole is naturally 1.00% so if we had a model wing of 6" chord we would simply lay a base line 6" long and mark the stations from left to right as follows:

The first one being .0125% of the chord we multiply 6" by this or 6" x .0125 = .075 of an inch and so on to the left.

Now when the stations are marked it is necessary to determine the points above the base line that the lines of the wing profile must pass. This is done the same way. The first point is .0081 x 6" = .0486 or the point is located .0486" above the base line and so on.

Now it is rather difficult to get the points exact for a model but you need only get them as close as possible.

The curves can also be used for laying out wings. Ribs for big machines. It is, of course, easier to get the points exact than if they were being used for model.

The following list will be helpful in conjunction with the curves.

U. S. A. 1

L of i	K_y	K_x	L/D	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000399	.0001515	2.64	....
— 2°	.000156	.0000905	1.72	....
— 1°	.000432	.0000700	6.15	.620
0°	.000721	.0000653	11.00	.530
1°	.000936	.0000670	14.00	.463
2°	.001146	.0000688	16.60	.415
4°	.001510	.0000860	17.50	.340
6°	.001878	.0001158	16.20	.316
8°	.002230	.0001558	14.30	.303
10°	.002580	.0002055	12.60	.290
12°	.002910	.0002595	11.20	.283
14°	.003165	.0003040	10.40	.274
16°	.003165	.0003710	8.50	.276
18°	.003080	.0005520	5.60	.310
20°	.002882	.0008500	3.40	.360

U. S. A. 2

L of i	K_y	K_x	L/D	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000228	.000147	— 1.55	....
— 2°	.000363	.000108	3.37	.733
— 1°	.000625	.0000943	6.64	.522
0°	.000862	.0000872	9.88	.445
1°	.001075	.0000816	13.26	.388
2°	.001292	.0000848	15.22	.352
4°	.001678	.0001027	16.34	.317
6°	.002090	.0001320	15.80	.292
8°	.002432	.000175	13.88	.276
12°	.003179	.000270	11.75	.255
16°	.003362	.000410	8.20	.247
18°	.003100	.000701	4.41	.228
20°	.002770	.000871	3.18	.230

U. S. A. 3

L of i	K_y	K_x	L/D	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000506	.0001589	—3.19	....
— 2°	.000420	.0001052	3.99	.676
— 1°	.000692	.0000845	8.20	.482
0°	.000928	.0000835	11.10	.403
1°	.001123	.0000856	13.10	.353
2°	.001210	.0000889	14.75	.323
3°	.001508	.0000893	16.16	.295
4°	.001704	.0001073	15.88	.280
5°	.001919	.0001180	16.18	.260
8°	.002520	.0001823	13.82	.230
10°	.002905	.0002290	12.70	.220
12°	.003160	.0002830	11.15	.208
13°	.003235	.0003142	10.30	.204
14°	.003240	.0003410	9.50	.197
15°	.003215	.0003780	8.50	.197
16°	.003155	.0004460	7.02	.197
18°	.003125	.0006620	4.73	.236
20°	.002889	.0008570	3.37	.266

U. S. A. 4

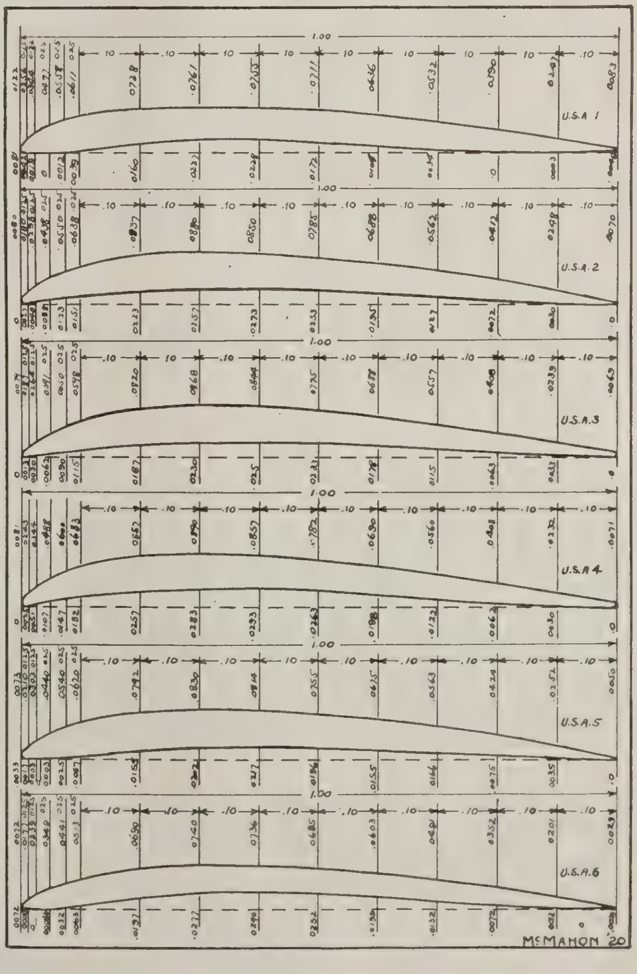
L of i	K_y	K_x	L/D	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.0001231	.0001640	—0.75	....
— 2°	.0005200	.0001150	4.52	.670
— 1°	.0007650	.0001078	7.11	.525
0°	.0009750	.0001032	9.44	.461
1°	.0011840	.0001002	11.80	.416
2°	.0013820	.0000995	13.90	.388
4°	.0017700	.0001115	15.88	.347
5°	.0019800	.0001340	14.80	.330
8°	.0025600	.0001900	13.50	.298
10°	.0029900	.0002555	11.70	.273
12°	.0033100	.0003100	10.67	.276
14°	.0036000	.0003545	10.15	.276
16°	.0036150	.0004430	8.15	.276
18°	.0034700	.0005580	6.22	.303
20°	.0031000	.0007640	4.06	.335

U. S. A. 5

L of i	K_y	K_x	L/D	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000326	.0001500	—1.58	....
— 2°	.000346	.0000948	3.64	.753
— 1°	.000636	.0000830	7.67	.566
0°	.000910	.0000741	12.28	.498
1°	.001145	.0000803	14.28	.444
2°	.001355	.0000863	15.72	.415
3°	.001565	.0000966	16.21	.377
4°	.001740	.0001092	15.98	.348
5°	.001950	.0001290	15.35	.337
8°	.002470	.0001830	13.52	.315
10°	.002870	.0002380	12.08	.303
12°	.003130	.0002890	10.84	.300
13°	.003240	.0003290	9.84	.298
14°	.003285	.0003545	9.25	.288
15°	.003235	.0003910	8.28	.292
16°	.003205	.0004210	7.63	.298
18°	.003150	.0006900	4.57	.330
20°	.002790	.0008200	3.41	.368

U. S. A. 6

L of i	K_y	K_x	L/D	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000276	.0001395	—1.98	....
— 2°	.000272	.0000793	3.43	.910
— 1°	.000567	.0000671	8.46	.600
0°	.000845	.0000650	13.00	.498
1°	.001057	.0000668	15.88	.458
2°	.001255	.0000733	17.15	.439
3°	.001455	.0000858	16.98	.402
4°	.001662	.0000976	17.95	.388
5°	.001846	.0001121	16.48	.365
8°	.002415	.0001665	14.50	.322
10°	.002650	.0002160	12.27	.306
12°	.002861	.0002820	10.15	.310
13°	.002910	.0003260	8.94	.310
14°	.002980	.0004050	7.37	.310
15°	.002960	.0005300	5.58	.328
16°	.002900	.0006380	4.55	.346
18°	.002790	.0007900	3.53	.365
20°	.002585	.0009000	2.88	.388



Aeronitis

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Flying Cadets

Oh the flying cadet, a strange animal is he,
On promises and hopes he lives.
While not thinking of some Jane at home,
His time to his work he gives.

And if you are broke don't come to this bird,
The chances are, he is broke too,
But if it's advice on flying you want,
He will tell you of stunts that are new.

At studying motors he ever is shy,
At the thought of panels he croaks,
And if you say "Laison" he asks for a brick,
He leaves that for simpler folks.

He teaches instructors the rules of the air,
And writes to his people at home,
"I got grounded today, for looping the loop,
By a lieutenant with an ivory dome."

But he is ever on hand in fair weather or foul,
When the chow call the bugler does play.
So let him alone and give him a chance,
And he'll be a lieutenant some day.

A Proper Start

"So your husband refused to buy you an aeroplane?" "Not exactly refused; he said I ought first to become familiar with machinery in general, so he bought me a sewing machine."

Loud Talker

Pilot—"Why are you wearing such loud clothes?

Observer—"Well, you see I am bashful and need something to speak for me."

Dad Knows

"It would make a good looking picture if you put your hand on your father's shoulder," said the photographer

"It would make a more natural one if he put his hand in my pocket," said the aviator's father.

Ruth: "They say Captain Towne, the flyer, lost the use of both arms in the war."

Gladys: "That isn't true; he called on me last night."

Visibility Good

First Aviator—"What did you think of the chorus in that show at the Whitney the other night?"

Second ditto—"I knew it would be a success before the curtain had gone up two feet."

It's All Wrong

Two pretty girls met in the street and kissed each other rapturously. Two aviators watched the proceeding.

"There's another of those things I hate," said one.

"What's that?" asked his friend.

He pointed to the scene. "Women doing men's work."

An Army Note

The parachute of increased pay will ease the drop from temporary rank—if it opens up in time.—*Liaison.*

Up in the Air

Aviator (to postman)—Have you got any mail for me?

Postman—What is your name?

Aviator—You will find it on the envelope.—*Judge.*

Commanding Orders

Air Service Captain (sharply)—Button up that coat.

Married Recruit (absently)—Yes, my dear.

Question Box

Anxious.—I am inexperienced and tried to do a loop. I am still up here on my back. How can I come out?

Ans.—Unfasten your belt.

Barber of Seville.—Did you read about Ivan Gates, the San Francisco aerial cop, shaving himself in midair?

Victim.—Yes, but there have been many close shaves in midair.

HINKY DINKS BAR
OPEN ALL-NITE
TRA-LA-TRA-LA!!! WE WON'T GET HOME UNTIL MORNING—Hick'
BREWERY
TAXI
NEW DRINK BI-PLANE BEER
FLY-COP
GOSH! HERE I AM, DRY AS A FISH WOULD BE ON THE SAHARA DESERT, AND ALL THE MACHINES ARE ON THE HUMMER. WOULDNT THAT FREEZE A BRASS MONKEY!
WELL WHATS A FELLER GOING TO DO
SAY DO YOU SEE MY CHAUFFUER UP THERE?
Freborg

Drawn by W. B. Freborg.

LOOKING INTO THE FUTURE

Among the many intricate questions which aircraft will probably solve is the momentous problem of prohibition. Who can say but that a few years from now we will have the alcoholic three-mile strata.

27,105
AEA

AERIAL AGE
WEEKLY

l. 11, No. 5 APRIL 12, 1920 10 CENTS A COPY

Captain H. S. Broad, R. A. F., Climbing in a Sopwith Camel

How the "Surplus" Aeroplanes Spectre is Being Put to Work to Produce Permanent Business for the Aeronautic Industry

LISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
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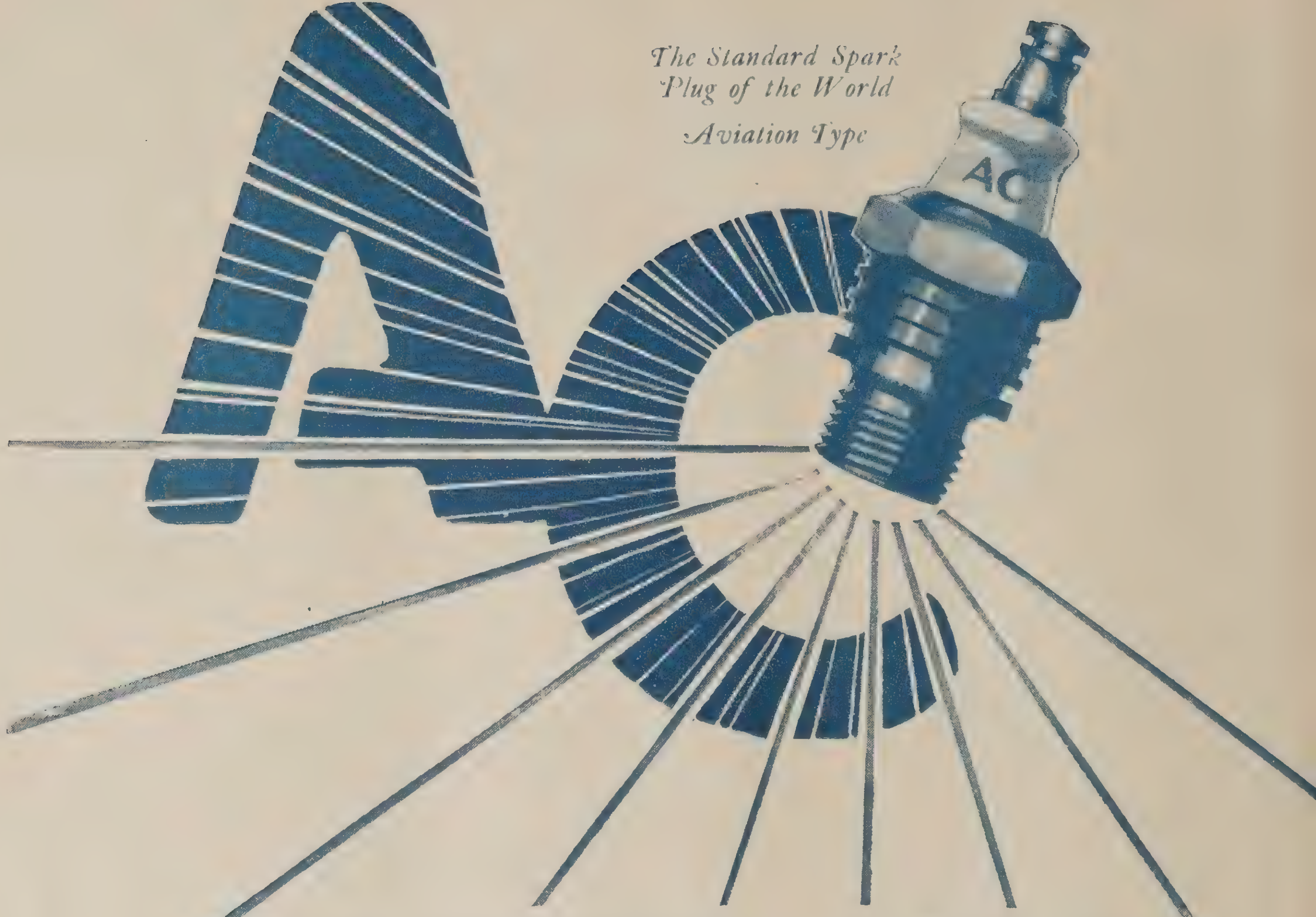

The Standard Spark Plug of the World

Aviation Type

A census of the exhibits displayed at the New York Aeronautical Exposition showed that more aviation engines were equipped with AC Spark Plugs than with all other makes combined. There is but one reason for this pronounced preference—AC's are deserving of it. They have proven best in every conceivable test and in every form of flying service.

Champion Ignition Company
FLINT, *Michigan*

These manufacturers use AC Spark Plugs for factory equipment

Acason Trucks
Ace
Acme Trucks
Advance-Rumely Tractors
Ahrens Fox Fire Trucks
American Beauty
American-LaFrance
Anderson
Apex Trucks
Apperson
Appleton Tractors
Argonne Four
Associated Engines
Atco Trucks
Austin Manufacturing Company
Available Trucks
Avery Tractors
A & T Tractors

Bates Steel Mule Tractors
Beaver Motors
Beck-Hawkeye Trucks
Beeman Garden Tractors
Bellanger Freres (France)
Bessemer Trucks
Betz Trucks
Birch
Bour-Davis
Braddon
Bradley
Briggs & Stratton Motor Wheel (formerly Smith)
Brinton Trucks
Brockway Trucks
Buda Motors
Buffalo Motors
Buick
Bullock Creeping-Grip Tractors

Cadillac
Cameron
Capital Engines
J. I. Case T. M. Co.
Chandler
Chevrolet
Chicago Trucks
Clark Tractors
Cleveland
Cole
Collier Trucks
Comet
Commonwealth
Conestoga Trucks
Continental Motors
Curtiss Aeroplanes

Daniels
Dart Trucks
Davis
Defiance Trucks
Delco-Light
Denby Trucks (Canada)
Diamond T Trucks
Diehl Trucks
Dodge Brothers
Doman Engines
Domestic Gasoline Pumping Engines
Dort
Duesenberg Motors
Duty Trucks
Dynelectric Plants
Eagle Tractors
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G. B. S. Motors
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Hackett
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Hall Trucks
Hamlin-Holmes Front Drive
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Hatfield
Haynes
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Howell Tractors
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Hurlburt Trucks
H. R. L. Trucks
Independent Trucks
Jackson
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Jordan
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Kalamazoo Trucks
Karavan Trucks
Kearns Trucks
Kent Concrete Mixers
Kenworthy
Keystone Trucks
Kissel Kar
Kleiber Trucks
Klemm Trucks
Knox Tractors
Koehler Trucks

Lalley-Light
Lawson Tractors
Leach Power-Plus Six
Liberty
Linn Road Tractors
Locomobile
L. M. C. Trucks

Maccar Trucks
Maibohm
Marmon
Master Trucks
Maxim Fire Trucks
Maytag
McLaughlin (Canada)
Menominee Trucks
Meteor
Midwest Engines
Milwaukee Gasolene Locomotives
Minneapolis Motors
Minneapolis Tractors
Mitchell
Monroe
Moreland Trucks

Napoleon Trucks
Nash
National
Nelson
Nelson Tractors
Nelson & LeMoon Trucks
Netco Trucks
New Britain Tractors
Noble Trucks
Northlite Lighting Plants

Oakland
Old Reliable Trucks
Oldsmobile
Oneida Trucks
Owens Light & Power Plants

Packard
Paige
Pan
Parker Trucks
Paterson
Patriot Trucks
Perfect Power Sprayers
Phianna
Pierce-Arrow
Pilot
Pioneer Tractors
Pittsburgher Trucks
Porter
Premier
Ranger Trucks
Red Wing Thorobred Motors
Reo
Re Vere
Reynolds Trucks
Riker Trucks
Roamer
Roberts Motors
Robinson Fire Trucks
Rock Falls
Rowe Trucks
Rutenber Motors
R. & V. Knight
Samson Tractors
Sandow Trucks
Sanford Trucks
Sawyer-Massey Tractors (Canada)
Saxon
Scripps-Booth
Scripps Motors
Walden W. Shaw
Signal Trucks
Singer
Speedway Motors
Standard "8"
Standard Trucks
Stanwood
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Sterling Engines
Sterling Trucks
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Stewart Trucks
Stockton Tractors
Stoughton Trucks
Straubel Engines
Sullivan Trucks
Super Trucks
Swartz Lighting Plants
S-S-E-Co.

Texan
Tiffen Trucks
Tioga Tractors
Titan Trucks
Tower Trucks
Trego Motors
Turner-Simplicity Tractors

Union Marine Engines
United Trucks
Universal Trucks

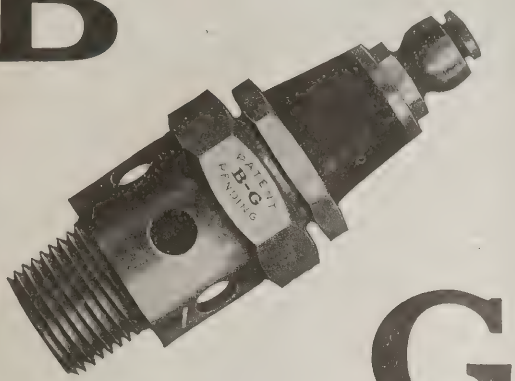
Van Blerck Motors
Veerac Motors
Vim Trucks
Vogue

H. J. Walker Motors
Wallace Tractors
Walter Trucks
Ward La France Trucks
Westcott
White
White Hickory Trucks
Whitney Trucks
Wichita Tractors
Wilson Trucks
Wisconsin Motors
Wolverine Tractors
Woolery Ry. Motors
W. S. M. Motors

U. S. Pat. No. 1,135,727, April 13, 1915; U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending

"The Plug that Cleans Itself"

B



G

"The Plug with the Infinite Spark"

THE self-cleaning feature of the B. G. Plug which is obtained by the high pressure air blast directed over the sparking points explains its remarkable effectiveness.

On the compression stroke of the piston pressure is accumulated in the body of the plug in the space provided above the sparking points. The explosive mixture enters the chambers through four holes drilled at an angle through the base of the plug and the opening around the center electrode, scavenging the points in passing. Such oil as may find its way through these holes is caught in an oil pocket immediately above them, the pure mixture passing into the compression chamber of the plug.

On the power stroke of the piston the accumulated oil and pressure escape through the holes. The pure mixture passes out at great pressure, being deflected against the sparking points in leaving the chamber, thereby keeping the points clean.

Write for descriptive circular of B. G. Plugs, Installation chart, together with prices and record of achievements.

BREWSTER-GOLDSMITH CORPORATION

33 Gold Street New York City, U. S. A.

AERIAL AGE
WEEKLY

VOL. XI APRIL 12, 1920 No. 5

TABLE OF CONTENTS

PAGE
How the "Surplus" Aeroplanes Spectre is Being Put to Work to Produce Permanent Business for the Aeronautic Industry........ 147
The News of the Week........... 149
The Aircraft Trade Review....... 151
Avro Triplane Type 547.......... 152
Variation of Horsepower with Temperature.................. 154
Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures............. 158
Naval and Military Aeronautics... 159
Foreign News................... 160
Elementary Aeronautics and Model Notes......................... 161
Aeronitis...................... 162

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Curtiss

The Seagull Always Comes Home

Worries spoil pleasure.

When you start out on an automobile trip, you always enjoy yourself most when you have confidence in your car.

It's the same in flying.

When you leave your home in the morning—for a 500 mile aerial cruise—you don't want to be bothered about what might happen.

The Curtiss Seagull inspires confidence.

Built by the leading designers of aircraft, backed by a company that can point back with pride to years of experience, the Seagull is the epitome of *Safety* and *Reliability*.

All other qualities are subordinate to these.

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164

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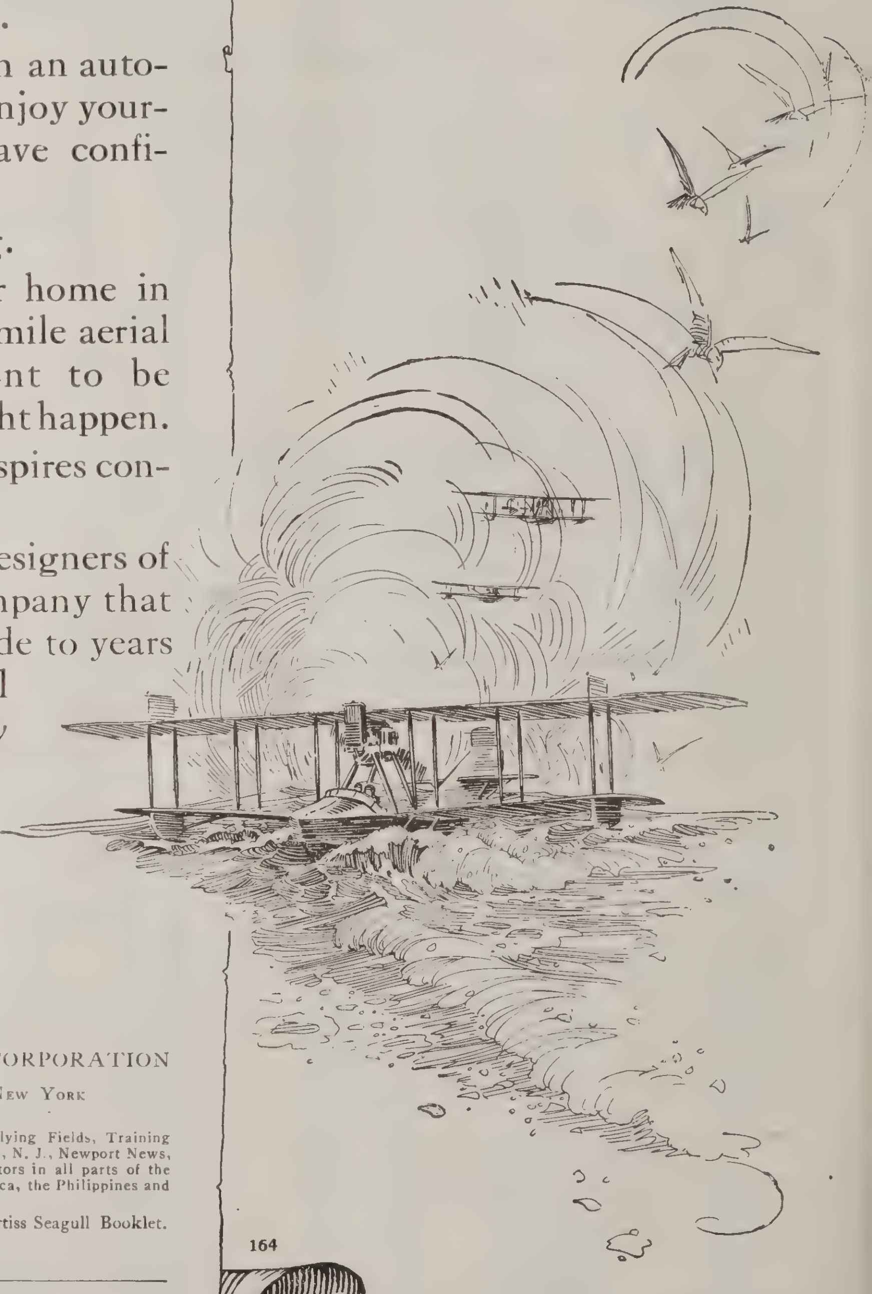

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VOL XI. NEW YORK, APRIL 12, 1920 NO. 5

HOW THE "SURPLUS" AEROPLANES SPECTRE IS BEING PUT TO WORK TO PRODUCE PERMANENT BUSINESS FOR THE AERONAUTIC INDUSTRY

Surplus Military Aeroplanes Permit the World to Try Aeroplanes for Different Purposes at Low Cost and Find Their Usefulness—Thereby Creating Permanent Demand

A REPORT was presented to the Board of Governors of the Aero Club of America by Mr. Henry Woodhouse, member of the Board and Vice-President of the Aerial League of America, telling the amazing development which has taken place in aeronautics and pointing out that the dumping of surplus military aeroplanes on the market has been beneficial to aviation as it permitted the world to try aeroplanes at low cost for different purposes and find their usefulness and thereby create a permanent demand.

Mr. Woodhouse's report, the first estimate of its kind made anywhere, reads in part as follows:

"The world will be glad to know that the bulk of the military aeroplanes for which hundreds of millions of dollars was paid are being salvaged and that in the process of salvaging these aircraft are used for utilitarian purposes and a permanent use for aircraft is created which will establish the aeronautic industry on a self-supporting basis.

"The results of the past six months justify us in stating that the sooner the world is allowed to have the twenty thousand surplus military aeroplanes of the Allied nations aeronautics will be established on a permanent basis, the spectre called 'surplus' will get to work to create permanent business for the aeronautic industry.

The World Found More Uses for Aeroplanes Than All of Us Ever Dreamed Could Exist

"The world is ready to try aeroplanes for different purposes. The civilian world has acquired about 4,000 surplus aeroplanes during the past nine months and has found more uses for aeroplanes than the most optimistic prophets of aviation ever dreamed could exist.

"The only limitation and complaint one hears is that aeroplanes are not available in large enough number and large enough in size to permit establishing aerial transportation lines and using more extensively.

"Likewise the work of establishing aerodromes is being delayed by the fact that there is not a sufficient number of aeroplanes in use to justify many cities and organizations in establishing aerodromes. But the evidence of substantial prospects of permanent aerial transportation lines being established, aerial tours being instituted, as planned by Major Charles J. Glidden, president of the Aerial Touring Association, and reasonably substantial use of aircraft for pleasure, sport, transportation and other purposes, is creating inducements for cities, firms and individuals to establish aviation fields with aerial garage facilities for air travellers.

"The Aero Club of America and the Aerial League of America have received hundreds of requests for advice and information from cities, firms and people who want to establish aerodromes.

A Year Ago There Was Not a Single Civilian Aeroplane in Use, Now There Are Two Thousand In Use and Ordered

"Let us not forget that this great progress in the application of aeroplanes has been amazingly swift. Exactly a year ago there was not a single civilian aeroplane in use. This was true the world over. In England permission for civilian flying was only granted on May 1st, 1919, in other countries several months later. In the United States on May 1st, 1919, there was only one old training aeroplane in civilian use. It had been in a barn on Long Island since 1916 and was bought for a few hundred dollars by an aviator who elected not to wait for the Government to release aeroplanes for civilian use.

"Hundreds of ex-Army and Navy aviators who had left the service and wanted to buy aeroplanes for various uses could not get deliveries and hundreds came to the Second Pan-American Aeronautic Exposition at Atlantic City from May 1st to June 1st, 1919, and bid large sums for the first 'Oriole,' the only touring type aeroplane that had been brought there. For months aerial contests with prizes amounting to over $100,000 and aerial tours and establishing air lines were held in abeyance, waiting for the release of aeroplanes by the Army and Navy and production by the manufacturers, which only happened very late in the Summer, and Fall, so that all contests had to be called off for the year.

"Over two thousand aeroplanes have been bought by civilians during this short time in the United States alone and five times as many would have been sold if the prospective purchasers had not felt that they might do better later, if they waited for other surplus stock to be placed on the market.

How Surplus Military Aeroplanes Have Become Connected With Different Lines of Human Endeavor, and Solve Most Difficult Problems and Give Efficient Service

"During the recent tour of the United States our Committee studied at close range the enormous interest in aeronautics throughout the country. The Commissions of the Club and the League travelling around the world, organizing the First Aerial Derby Around the World in 32 countries have also sent extensive reports of aeronautic activities in other countries.

"Following are a few of the uses to which aeroplanes have been put or have been planned and usefulness demonstrated during the past year, taken at random from hundreds of cases and reports received from different parts of the world: mail carrying, inter-city traveling, commuting, taxi-service, aerial express, aerial sight-seeing of battlefields, flights for guests at hotels and summer resorts, campaigning, selecting land sites, surveying oilfields, carrying pay-rolls, delivering fresh fish, transportation and distribution of food, film delivery, transportation of government officials, laying out logging routes, forest fire patrol, commercial aerial photography, making motion picture films, ranching, missionary work, commercial traveling, delivering clearance papers, forest surveys, carrying prisoners, visiting remote points, railroad survey, passport delivery, making photographic Chamber of Commerce reports of real estate and city property, carrying samples of minerals and timber to prospective purchasers, transporting mining inspectors and surveyors, aerial advertising, astronomical observation, emergency medical service, marketing garden truck, sheep and cattle herding and locating stray cattle, locating of good grazing land, delivery of spare parts of machinery and mechanical apparatus, lack of which keeps hundreds of men and plants idle, studying development of sections of cities, architectural studies of individual buildings or groups of buildings, taking progressive aerial photographs showing development at various steps, aerial studies to get influence of surrounding buildings, getting bird's-eye views of existing groups—for modification or development, study of city planning and improvement, studies of river and harbor terminal problems, observation of river flows to determine location of breakwater, channels, etc., studying street layouts, parks, building problems, congestion, fire regulations, etc., Police Department adjuncts, Fire Department adjuncts, fire locating and district surveys, smoke nuisance investigation, ambulance purposes, transfer of patients from vessels to hospital, transporting physicians for emergency cases, transporting of surgical instruments and supplies, Boundry Patrol, Customs and Revenue Service adjuncts, Life Guard service, Life Saving service, Light House Tender service, making maps, and coast and geodetic surveys, preliminary studies of grounds for preparing development plans, carrying crews to do repair work for telephone and telegraph companies, studying the movement of tides and currents for shore breakwater development, taking of soundings in shallow or swampy country, not open to navigation, studying of river traffic, river flow, and location of docks and terminals, dredging studies, from observations of flow of streams, topographic studies of ground layout for planning streets, water systems, soliciting towing business, surveys of docking, delivery of perishable products, delivery of machine parts, delivery of frail articles, polar exploration, baseball transportation, crop survey, lumber cruising, real estate survey, carrying precious ore and bullion, quick delivery of merchandise, fur carrying, delivering newspapers, railway terminal surveys, southern plantation travel, locating outlaw cotton fields in stamping out Boll Weevil, aerial ferrying, delivering mail at sea, delivering delayed documents, carrying delayed advertising copy to publications, bombing ice jambs, locating schools of fish, detecting cattle rustlers, rescuing people marooned on ice, locating seal herds, locating and bombing schools of whales and porpoises which chase edible fish, carrying newspaper reporters to assignments, making fast delivery of photographs of current events for publication, locating marine derelicts and wreckages at sea, locating stray cattle on ranches, bringing serum to save the lives of poisoned persons, delivering fresh flowers, hunting hoarders, carrying insurance adjusters, detecting smugglers, carrying hunters to hunting grounds, carrying fishermen to ideal spots and using flying boats as base from which to fish, transporting golf players to the links.

Fostering Progress With Salvaged War Aircraft

Two thousand aeroplanes are being used for everyday purposes in the United States and Canada and several thousand more are ordered, many of which are to be used to establish aerial transportation lines throughout the United States, Canada and South and Central America. All of these aircraft are war machines, mostly aeroplanes that are sold just as they were made for war purposes. Some have been modified to some extent.

Thousands of aeroplanes are being built from motors, parts and accessories left over from the huge war programs. In England the large dirigibles, including the R-34, which crossed the Atlantic, and the large aeroplanes like the Vickers-Vimy which flew across the Atlantic, the Vickers which flew from London to Australia, and the Handley Pages which flew from London to India and from London to Russia, are being put to commercial uses, in the service of Progress and Civilization.

Most of these aircraft have been sold to be used for commercial purposes for a fraction of their original cost. We know that many dealers and manufacturers have made large profits in buying and selling these aircraft, but we also see the great outstanding gain to Civilization and Progress of having had these war aircraft turned over to the public for commercial and everyday uses.

No one ever dreamed that there would be so many uses for aircraft until the aircraft became available cheap enough for people to try them for different purposes. Had not these aircraft been dumped on the market so inexpensively, it would have taken years to bring about the use of aircraft for general purposes. As it was, the dumping of these war aircraft on the market made it possible to try aircraft for various purposes at low cost and to prove their value, and, thereby, create a permanent demand for aircraft which is benefitting not only the world as a whole by bringing into use an improved and faster means of transportation and a new beneficial factor, but is also creating a permanent demand for aircraft, thereby establishing the aeronautic industry on a substantial basis.

Holding Back Surplus Planes Delays Purchase of Planes for Utilitarian Purposes and is Injurious to Aeronautic Movement

"It is evident that the only mistake that can be made is to hold up the surplus aeroplanes, because many people will wait to place their orders, hoping to get surplus aeroplanes cheap, and while they wait opportunities to apply aeroplanes for more extensive general use are lost.

"The element of time is especially important. Flying equipment must be made available early enough in the year so it can be used during the flying season, because we have not yet made suitable arrangements for winter flying.

15,000 Aeroplanes Needed for Passenger Carrying in 10,000 American Communities

"During our recent tour of the United States, studying aeronautic interest and activities, we came in direct contact with over one hundred communities and found everywhere a strong demand for aeroplanes for passenger carrying. We found some small communities that supported one or more passenger carrying aeroplanes and the aviators in those communities told us that they were well patronized. It is conservative to state that five hundred of the largest cities can patronize and support immediately twenty aeroplanes each and ten thousand of the smaller communities will patronize and support an average of one aeroplane each.

Thousands of Large Aeroplanes Needed for Transportation of Express and Passengers

"Thousands of aeroplanes are needed for the transportation of express and passengers. These transportation aeroplanes are not to be had at present, cannot be produced this year by our manufacturers. We have been co-operating with interests that have been planning to establish aerial transportation lines this Spring and Summer and have tried to assist them to get deliveries of twenty large aeroplanes of any kind. Months were spent only to find out that it would be impossible to get even six large aeroplanes on time to establish these lines this summer. And the need is for six hundred or more large aeroplanes, the largest made.

"Here is where large surplus aeroplanes save the situation—and the surplus planes can be gotten out of the way this year, and put into uses which create a permanent demand for better types to be manufactured next year, when the aircraft manufacturers will have delivered their present orders and will be ready for new business.

Let the World Have All the Surplus Aeroplanes Cheap This Year and the Demand for Aircraft Hereafter Will Create a Large Aeronautic Industry

"We cannot overemphasize the advisability of letting the world have all the surplus aeroplanes, which amount to only 20,000 in number, this year and let the world have these aeroplanes cheap enough to permit trying these aeroplanes for various purposes, in different activities in every line of human endeavor.

"As has been the case during the past nine months, the world will find the aeroplanes very useful, capable of solving some of the most difficult problems of transportation, and meeting the requirements of this intensive age when time is such a great factor in all human activities.

"Out of this general use of surplus aeroplanes there will be created a permanent large demand for better and more economic aeroplanes, such as are being constructed now for civilian purposes and for general transportation.

"We must not forget that to conduct an efficient aerial transportation line across the Atlantic, it would require no less than 20 large aeroplanes, larger than the largest machine being constructed today, and the manufacturing of the aeroplanes and supplying the equipment to operate a single line would be an order large enough to keep the largest aircraft manufacturer busy for a year.

This fact has been proven by Mr. Alfred W. Lawson, the eminent aircraft constructor, who during the past year flew his air liner from Milwaukee to different cities and found the interest in aerial transportation so great that he lost no time in deciding to proceed to establish aerial transportation lines, and he found that it takes a year to produce a sufficient number of large aeroplanes to establish and operate a substantial aerial transportation line. This has also been found to be true by F. Handley Page, the Vickers, Airco and Bristol Companies, Caproni, and Henry Farman, and other British, French and Italian aircraft manufacturers who have been operating air lines, as well as by the U. S. Post Office, whose figures on equipment and cost of maintenance of aerial transportation are most reliable.

(*Continued on page* 157)

THE NEWS OF THE WEEK

Gianni Caproni Arrives in New York

Gianni Caproni, the Italian aeronautic engineer and manufacturer, arrived in New York recently from Italy, on a business trip that will necessitate his remaining in this country for several months.

At the Aero Club of America, where a dinner was given for him, Mr. Caproni told of a huge triplane, capable of carrying 100 passengers, which is being completed and is expected to be ready for its initial flight within a month. The plane weighs twelve tons, is capable of lifting twelve tons, and is equipped with eight Liberty engines of 400 horsepower each.

He also announced plans for a 12,000 horse-power plane, capable of carrying between 400 and 500 persons. The inventor said he was here to study the possibilities of aerial transportation lines with planes far larger than those now in use, and added that he had also come here to select a site for a big factory where his big planes might be built.

He predicted new motors of 2,000 horse-power each, and said he had invented self-adjusting motors and propellers which automatically changed with the change of altitude.

"Aces" Become Chevaliers

Washington. — Captains Edward V. Rickenbacker and Douglas Campbell, American aces, have been made Chevaliers of the Legion of Honor and awarded the Croix de Guerre with palm by the French Government. Captain Reed M. Chambers, also an ace, was made Chevalier of the Legion of Honor. The Croix de Guerre was awarded with palm to Lieutenants James A. Meissner, Leo H. Dawson and William W. Palmer, and with bronze star to Lieutenants Samuel Kaye, Jr., and Alden B. Sherry.

Colonel Edward Stanley Gorrell has been awarded the medal of the British Distinguished Service Order and Major Ernest J. Jones the French Medaille d'Honneur.

Canadian Air Force to Be Formed

Ottawa, Ont.—A Canadian air force is to be formed immediately. The personnel will be drawn from volunteers from the ranks of former officers and airmen of the Royal Air Force resident in Canada. These will train at centers which will be in operation all the year, and officers and men enlisted in the new force will spend at least one month out of every twenty-four in active training, receiving pay and traveling expenses during their active period.

The force will probably be limited in the beginning to about 5,000 men, inclusive of all ranks, and the training centers will not number more than one or two at first.

It is understood the government wishes to avoid an expensive permanent organization. The organization of the force will be placed in the hands of Canadians who have had experience in flying.

Ohio Plans Aerial Police Force

Cincinnati, Ohio.—A unique system of aerial police to protect the entire State of Ohio is being planned here. Details will be placed before the first convention of the associated aviation clubs of Ohio at Columbus, May 6, 7 and 8.

The establishment of an Ohio State Federal aviation reserve unit and the holding of an open air aeronautical show during the summer are planned.

The University of Ohio State has granted the use of its athletic grounds for a landing field for those who come to the convention by "the air route." Oil and gas will be furnished free by the State's natural gas corporations to promote the idea of the Ohio State aerial police system, which, it is expected, will furnish protection to concerns having long and complicated lines of transportation. This includes railroad lines.

Major Schroeder, Capt. Eddie Rickenbacker, Lieut.-Col. Hartner, Eddie Stinson and Orville Wright are said to be interested in the proposed aerial police system.

Armored Triplane Proves Success

Dayton, O.—The first test of the armored battle triplane, the first of its kind in the world, was recently performed with complete satisfaction on its maiden flight at McCook Field.

This aeroplane, which is known as the G. A. X. model, was designed and built at McCook Field. It weighs about 10,000 pounds and is fully armored.

The triplane was designed for ground attack work, although it is so equipped that it can take off rapidly and render effective service in the air. It is equipped with twin Liberty motors.

Every vital portion of the machine is protected with heavy armor and in addition to the pilot it will carry two observers for the gun pit. The fighting men are fully protected by armor so that not only the working parts of the machine but the crew within are thoroughly protected from the enemy's gunfire.

On its maiden flight the new armored plane was in the air fifteen minutes. Lieut. Harold Harris piloted it, with Lieut. George W. Elsey and Lieut. Charles N. Montieth as observers.

Col. Thurman H. Bane has been in charge of the construction and test of the machine.

$1,250,000 for Aerial Mail

Washington.—House conferees on the Post Office Bill have receded from their opposition to the Senate amendment providing for a trans-continental experimental mail aeroplane service between New York and San Francisco. The Senate appropriation was reduced to $1,250,000. Under the measure the Washington-New York aerial route is discontinued.

May Make Honeymoon Flight to U. S.

London.—The maiden trip of the giant transatlantic dirigible R-38, which is scheduled to start for America some time in May, 1921, will also be the occasion of the first transatlantic aerial honeymoon.

Commander Coil, the American aviator in charge of the flight, has become engaged to May Tresmand, the London comedy star.

She is very anxious to accompany him on the first trip of the R-38 to New York.

Stehlin to Fight Bolsheviki

Warsaw.—Major Joseph C. Stehlin, a twenty-three-year-old aviator of, Brooklyn, N. Y., who already has fought in three armies, has gone to Riga to enlist under the Lettish flag in the war against the Russian Bolsheviki. If his services are accepted he will have served under four flags in four years. The colors of France, America, Poland and Letvia, in turn, have won his allegiance.

Last September Stehlin joined the Polish forces recruited in New York, was commissioned as captain, went to Poland and was assigned to duty on the northeastern front. He spent four months with a Polish flying squadron, the only American with the Poles on that particular front, and participated in all the aviation work preceding and during the Polish attack on the Bolsheviki in the region of Dvinsk.

Government Contracts for Parachutes

As the result of official tests made of the Jahn quick-opening parachute during

The Salmson Biplane which has just been delivered to the New York Aerial Police. Major G. A. Pollock is shown in the photo, together with a French Air Service officer

the last three months by both the navy and post office department at Washington, orders for 3581 have just been placed with the Jahn Aerial Life Saving Apparatus Company, of Dayton, Ohio. Of this number, 1500 have been ordered for the use of the post office department, 1,469 by the United States navy and 612 by the United States marines.

It is claimed that the Jahn device is absolutely dependable for quick opening, insuring safe landing from altitudes as low as 50 feet from the ground and that this parachute will positively open within 30 feet after the release of its locking device.

One of the particularly strong points in connection with the Jahn parachute is the fact that it is possible for mail planes to dispose of their cargoes without landing.

In connection with the official tests made by the post office department recently at Washington, eggs were used to ascertain the severity of the shock sustained by the contents of the pouch when delivered on the ground. Two packages of eggs were delivered intact, not an egg being broken, the mail pouch in which the eggs were enclosed, landing directly in front of the post office entrance.

This parachute pack with its quick-releasing device, which can be used for both parcel mail and as a life preserver for persons, was invented during the war by L. B. Jahn. Its development to its present state of perfection has been made possible by Colonel T. H. Bane and Major E. L. Hoffman, of the McCook Field air service engineering division.

Prisoner Flies to Jail Strapped Beside Sheriff

Casper, Wyo.—A. F. Norby, under sentence of four years' imprisonment in the State penitentiary at Rawlins, left here recently in a plane, strapped securely to a seat beside a deputy sheriff.

A local aviator piloted the machine, which covered the distance in two hours. The trip requires twelve hours by train.

Former Army Aviators En Route to Cuba

During the last month 20 civilian aviators have stopped at Rich Field, Texas, en route to Cuba. Recently a party of four former army officers and four former enlisted mechanics in Curtiss machines landed at Rich Field on their way to Havana to fill a contract for exhibition work with the French-American Aero Club. The party was in charge of Pilot Ralph Lockwood of the Service Aviation Company, Wabash, Indiana.

Aerial Service Between Miami and New York

The Aero Limited has completed bookings for passengers desiring flights from Miami, Fla., to New York and Philadelphia. Trips will require sixteen hours of actual flying time, with three stops. This company will use fifteen seaplanes, carrying passengers.

Wants $60,000,000 for Aviation

Washington.—Appropriation of $60,000,000 for army aviation in 1921 has been recommended to the House Military Committee by Major Gen. Charles T. Menoher, Director of Air Service, $23,714,000 to be used for production and purchase of aeroplanes and $750,000 for balloons, airships and lighter-than-air machines.

Aerial Mail 157 Miles an Hour

Cleveland.—The speed record for aerial mail service between Cleveland and Chicago was broken recently when Pilot James H. Knight covered the 340 miles in 2 hours and 10 minutes, an average speed of 157 miles an hour.

The previous record, 2 hours and 12 minutes, also held by Knight, was made several weeks ago.

Victory Flyers Return to North Platte, Neb.

The Victory Flyers, composed of Pilots Reed E. Davis, Noel E. Bullock, and Business Manager E. T. Richards are to return from the south to North Platte, Nebraska, where they will carry on a business of selling aeroplanes, passenger-carrying, aerial advertising, package delivery and a school of flying.

This company has been operating a commercial flying business since last June, and has been very successful. They have carried passengers in fifteen states, and during the past winter have been at Jacksonville, Florida. The Frohman motion picture company has used the Victory Flyers for several of their pictures.

Girl Makes 25 Consecutive Loops

Paris.—An eighteen-year-old girl, Mlle. Bolland, has broken the French record for looping the loop. She did it twenty-five times in succession in a bi-motor machine.

Bakelite Propeller Put to Severe Test

The new Micarta or Bakelite propeller was recently put to a severe test, when Major William Ocker flying a D. H.-4, landed in the mud at Bolling Field, Washington, D. C.

Hardly had his wheels touched the ground when his plane nosed over. Before he could reach for the switch to cut off his engine the propeller succeeded in churning around in the ground several times. The force of this churning was so great that it threw his plane back into position while the wheels sank down to the hub in the mud.

When an examination of the propeller was made it was found to be in perfect condition and not even chipped.

Wireless Conversation With Aeroplanes

An interesting experiment was recently carried out with a Handley Page commercial aeroplane which strikingly illustrated the possibilities of the wireless telephone as a method of directly aircraft from the ground. While flying on the London-Paris air route the pilot, Capt. W. L. Hope, throughout the flight was in constant communication with ground stations by means of Marconi's wireless telephone.

On the journey from Cricklewood to Paris, the aeroplane, when over Croydon, received a spoken message from Hounslow giving a weather report, and while over Beacon Hill the machine received a message from Lympne. During the journey to the coast seven wireless stations were communicated with. Over the Channel the machine saw another Handley Page commercial aeroplane, proceeding from Paris to Cricklewood, and a message was sent to Lympne, announcing the approach of the latter aeroplane.

On the return journey from Paris to Cricklewood the weather reports received by the wireless telephone installed in the machine enabled it successfully to accomplish the journey despite the extremely bad weather. Low clouds and mists obscured the Channel when Boulogne was reached, but Lympne reported by wireless that conditions were improving on the other side. The pilot, therefore, decided to continue his journey over the Channel although another single-engine machine had turned back and later a further report was received that the weather was rapidly clearing and would be excellent by the time the machine arrived over the English coast. The pilot admits that had he not received these extremely valuable wireless messages he would have hesitated to attempt the Channel crossing in such inclement weather. The tests were a complete success, the voice being remarkably clear over a distance of 100 miles, and the course of the aeroplane was "plotted" throughout the London-Paris route by the ground stations.

Horace Keane, together with his sister, Miss Doris Keane, the noted actress, in the Ace Biplane now being exhibited in the first Broadway aeroplane salon

The AIRCRAFT TRADE REVIEW

Philadelphia Aero Service Has Anniversary

The Philadelphia Aero-Service Corporation celebrated their first year as a flying organization by a banquet at the Hotel Vendig in Philadelphia recently.

President Huyette in introducing the speakers of the evening made mention of the fact that the affair was not only given in honor of the first year's work just successfully concluded and the inauguration of the new year with enlarged activities, but also in honor of five flying students from widely distant points who were to receive their wings as full fledged pilots at the corporation's flying school.

These men were Lieutenant Jacinto R. Diaz of the Guatemalan Army, Donald C. Reams of East Ely, Nevada; William G. Daubenberg of Minneapolis, Minn.; D. B. Bartholomew of Waterloo, Ind., and William R. Seddon of Philadelphia.

The speaker of the evening was Professor Frank Green of West Chester who had as a subject "The Six Great Cities of the World." Much to the surprise of everyone, these cities were not the great cities of either the Eastern or Western Hemispheres, but were Capacity, Veracity, Tenacity, Simplicity, Vivacity, and Felicity. Professor Green most entertaingly applied the subject to the history and future of Aviation and to those present, including the full personnel of the officers, employees and students of the corporation.

An Excellent Development Plan

Memphis, Tenn.—What is believed by experts to be the most comprehensive scheme ever thought out for the advancement of aviation in the United States has been inaugurated by the Memphis Aerial Company, distributers in this district for the Curtiss Aeroplane and Motor Corporation, of New York. It contemplates the establishment of a flying club in every town in Tennessee, Arkansas and Mississippi, the territory covered by the company, with landing field, hangar, a Curtiss aeroplane, an instructor and a mechanic.

By the plan of the Memphis Aerial Company any person in the district with an average income and an ordinary physique may become part owner in an aeroplane and receive complete flying instructions at a cost not in excess of the membership fee for the common, non-productive club. The club to be established in all of the cities and towns of the district will offer, in addition to the flying instructions, a center for local social activities. The members will be kept in daily touch with national and international developments and events in aeronautics.

"You will be in on the ground floor of an industry," the announcement of the company reads, "which has a legitimate background with far greater possibilities than the moving picture and automobile industries."

According to the announcement, the nucleus of every club formed will be ten men, each of whom will contribute a fee that will go to make up a sum sufficient to support the club along the lines laid down by the Memphis Aerial Company. Immediately upon the formation of a club the company sends a representative from Memphis to assist in laying out a landing field and in perfecting the organization.

More than fifty towns within a radius of 150 miles of Memphis already are forming clubs. In virtually all of the towns listed letters have been written to the company by prominent local men expressing the desire to be in on the ground floor with their clubs.

"I feel confident that at least twenty-five clubs will be organized and in full running order by the middle of June," said G. G. Garrison, president of the Memphis Aerial Company. "We now have twenty-five planes on the way to Memphis to be distributed to the towns with club organizations."

As soon as each club is fully organized the company agrees to deliver to the club at its field as the club's own property the following equipment:

"A Curtiss aeroplane in perfect flying condition, a JN-4D or Standard. Either selection will be equipped with an OX-5 motor. This plane will be assembled and set up at our field. It will then be flown to your own town and delivered at your landing field free of charge. This company assumes all cross country hazard for this trip.

"A suitable hangar for this aeroplane will be constructed on your field at the expense of this company.

"Club members will receive flying instructions from experienced pilots, formerly instructors in the United States Army. Two months' time will be occupied in the schooling of ground work and air flying. At the expiration of such time of instruction all members of the club should be able flyers. This company pays the salaries of all its instructors.

"Your club further receives the services of an expert mechanic for a period of two months. This service will prove invaluable to each member. The mechanic's salary will be paid by the company.

Instruction pamphlets will be mailed weekly to each member of the club. These pamphlets cover the ground work essential to a pilot's course and include valuable information on such subjects as aerial motors, aerial instruments, aerial navigation and theory of flight.

"A membership in the Tri-State Flying Club Association. The personnel of this organization will be composed of men from different flying clubs.

"Subscription to the AERIAL AGE, the national weekly of aeronautical news.

"Hearty co-operation from aeronautical experts in the employ of the Memphis Aerial Company."

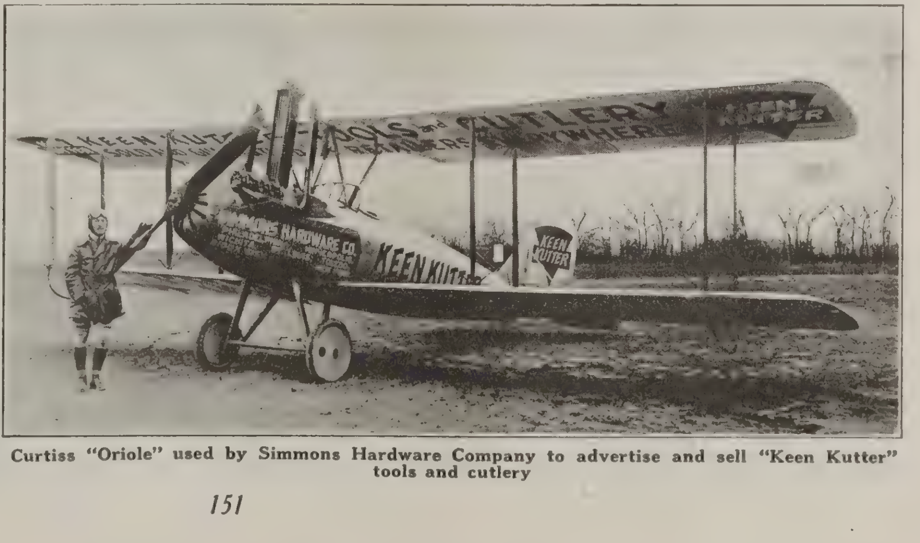
Advertising and Selling By Aeroplane

Selling and advertising hardware by means of an aeroplane has been adopted by the Simmons Hardware Company, of St. Louis, as the most up-to-date method of reaching the man on the ground, in the city or on the farm, who is in need of the implements in which this great house deals.

At the present time one of the Simmons salesmen is using a Curtiss Oriole covering his territory in Alabama. He is calling upon the merchants in all the towns and cities he visits, using the machine instead of trains for moving from one place to another. Occasionally he takes a townsman up for a short "hop." In one place the mayor went up with him for a flight.

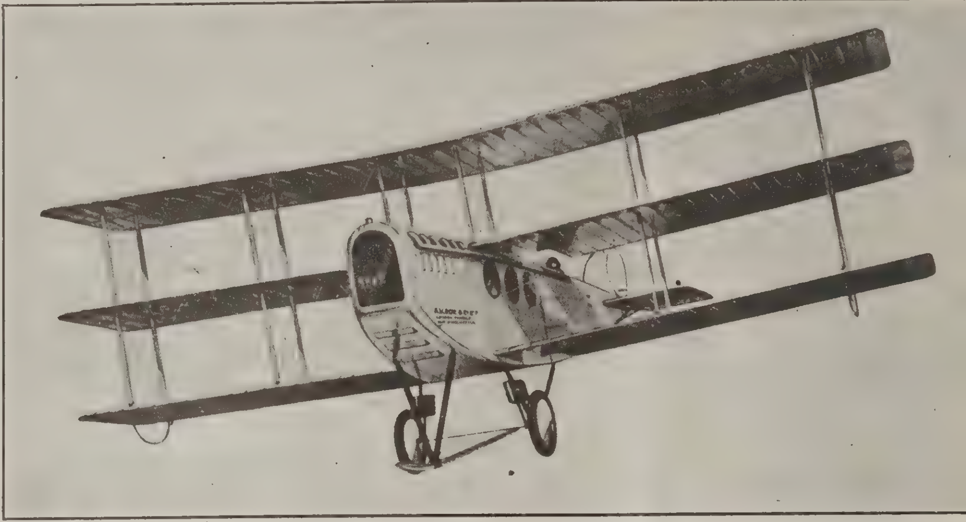
This novel scheme for advertising, selling and delivery has proved so satisfactory that the firm has under consideration the use of a fleet of aeroplanes throughout the country.

The machine in use in the South has been christened "Keen Kutter." The name is painted in big letters along both sides of the fuselage, on the rudder and at the tips of the wings. The name of the firm is painted on the nose of the fuselage, with the seven towns in which branches are located, and on the bottom of the wings, clearly visible from below as the aeroplane soars aloft, is this advertisement: "Keen Kutter Tools and Cutlery Sold and Guaranteed by Retailers Everywhere."


KEEN KUTTER TOOLS and CUTLERY
GUARANTEED BY RETAILERS EVERYWHERE
KEEN KUTTER
SIMMONS HARDWARE CO.
KEEN KUTTER
KEEN KUTTER

Curtiss "Oriole" used by Simmons Hardware Company to advertise and sell "Keen Kutter" tools and cutlery

AVRO TRIPLANE TYPE 547



MUCH interest has been created by the latest production of the Avro Company the 160 H.P. Triplane which has carried out its trials in England successfully. This aeroplane is a truly commercial machine, and is intended for passenger, cargo or mail work.

Accommodation for four passengers and the pilot is provided, but the seats may be removed, allowing a space of 113 cubic feet for cargo or mail.

In general detail and appearance, this machine known as Avro, Type 547 Triplane, is built along the usual Avro lines, using mostly parts of the standard type Avro biplane. This permits low production costs, and facilitates the maintenance of the machine.

The fuselage is extra deep to permit the provision of the cabin for passengers, which is just back of rear main plane spars. Access to the cabin is by means of a door in the side of the fuselage, and large triplex windows provide an excellent view for the occupants.

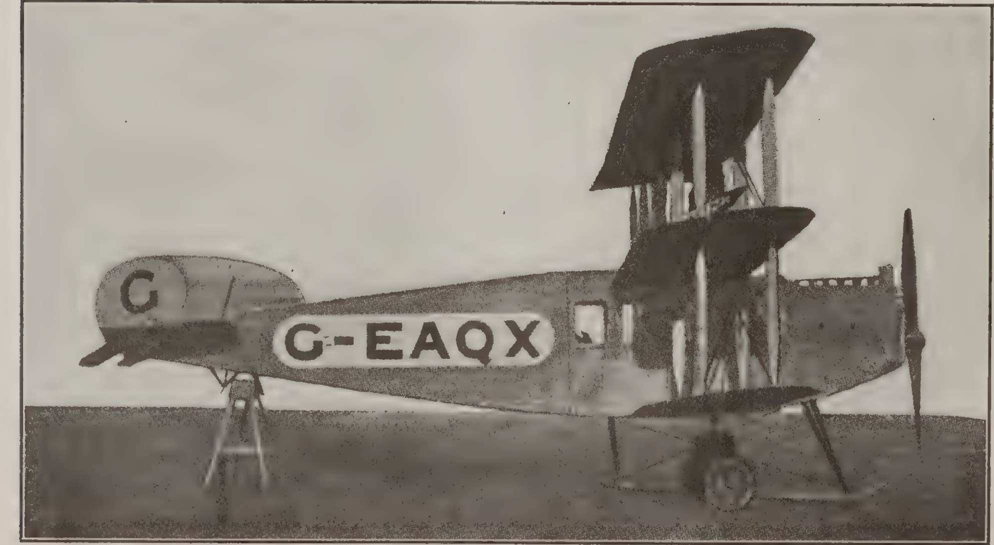
The pilot is seated well back along the fuselage where he can get an exceptionally clear view for landing or getting off. This is assured by the Triplane arrangement which is well known to give a superior view to that given by the biplane type. The landing chassis is of standard Avro type.

A 160 H. P. Beardmore, six-cylinder engine is installed in the nose of the fuselage. This engine is well known for reliability and low gas consumption—in this case, the Avro Triplane does nine miles to the gallon with five people on board and cruising at 80 miles per hour.

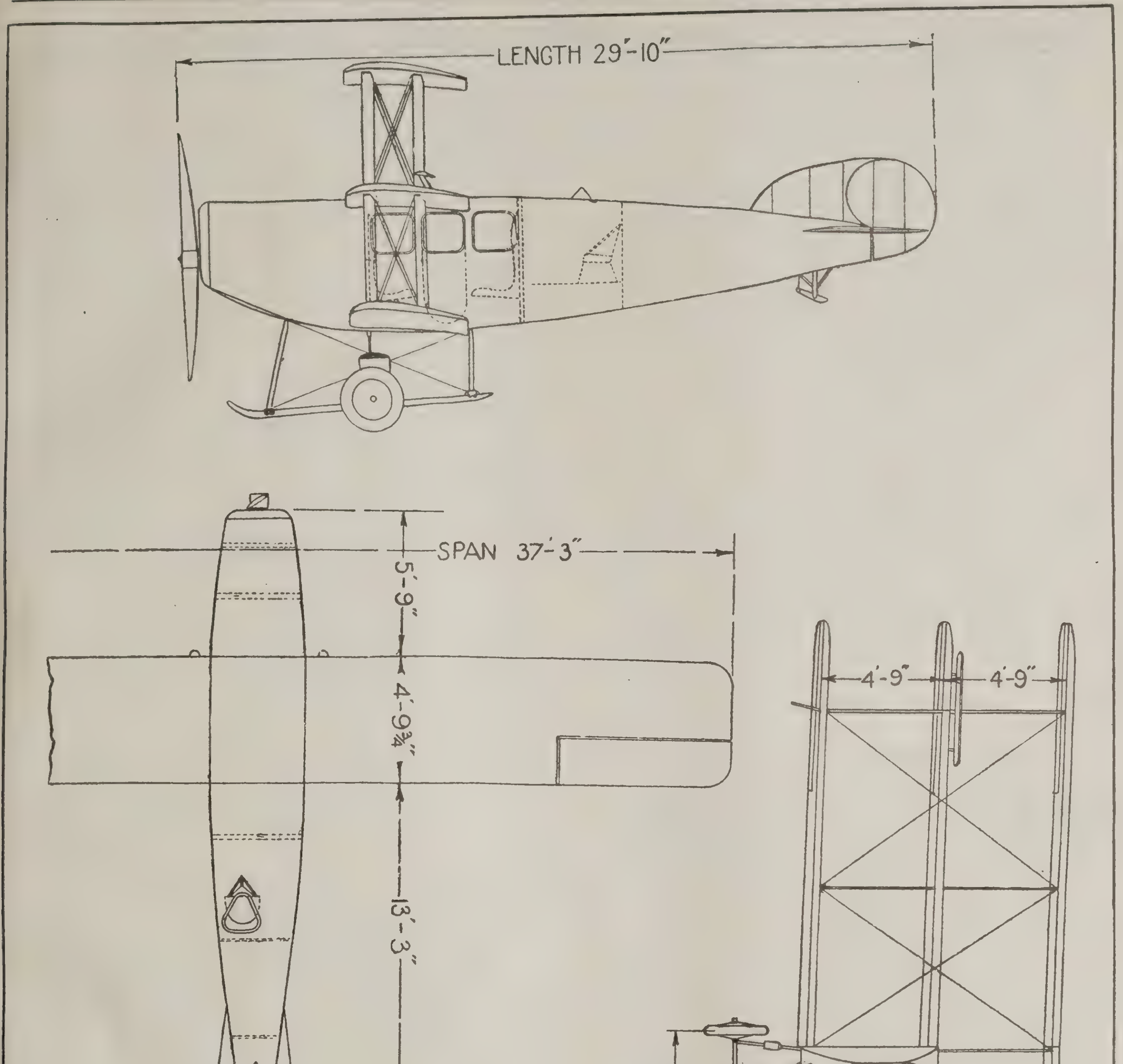
The three main planes are of equal span and chord. They are set at a dihedral angle of 2½°, but without any stagger or sweep back. Ailerons are fitted to all three planes, those on the middle ones being balanced by means of a small surface mounted forward of and above the leading edge of the aileron.

The specifications and characteristics of the Avro 547 Triplane are:

Span (all main planes)	37 ft. 3 ins
Chord (all main planes)	4 ft. 9¾ ins
Gap (all main planes)	4 ft. 9 ins
Dihedral angle	2½°
Length overall	29 ft. 10 ins
Height overall	14 ft. 5 ins
Area of main plane (including ailerons)	498 sq. ft
Area of ailerons (six)	69 sq. ft
Area of tail plane	26 sq. ft
Area of elevators	18 sq. ft
Area of fin	7.6 sq. ft
Rudder	9 sq. ft
Weight loaded	3,000 lbs
Load per square foot	6.6 lbs
Load per H. P.	18.8 lbs
Cruising speed	80 m. p. h
Consumption, cruising speed	9 gals. per hou
Range at cruising speed	444 mile
Max. speed	94 m. p. h
Landing speed	45 m. p. h
Climb 5,000 feet	15 mins
Climb 10,000 feet	38 mins



Side view of the Avro Type 547 Triplane, equipped with 160 H.P. Beardmore Engine



AVRO.
TYPE 547 TRIPLANE
160. HP. BEARDMORE.

VARIATION OF HORSEPOWER WITH TEMPERATURE

By H. C. DICKINSON, W. S. JAMES and G. V. ANDERSON

(Report 45 of the National Advisory Committee for Aeronautics)

Résumé

IN connection with tests of aeroplane engines made in the altitude laboratory of the Bureau of Standards it has become necessary to reduce horsepower at a given temperature to arbitrary standard temperatures in order to permit comparison of different tests.

As the result of a number of experiments made with two Hispano-Suiza engines and three different makes of carburetors, a correction factor has been determined, which may be expressed by F in the following equation:

$$HP = F \times HP_0$$

$$F = \frac{920 + t_0\ ^\circ\text{F.}}{920 + t\ ^\circ\text{F.}} \text{ or } F \doteq \frac{529 + t_0\ ^\circ\text{C.}}{529 + t\ ^\circ\text{C.}}$$

where HP_0 is the observed horsepower at the temperature t_0 °F and HP is the horsepower corrected to t °F.

This correction factor has been found to be somewhat variable with engine and carburetor conditions, but the above expression is believed to be approximately correct for the type of engine under consideration and for temperatures between — 20° and 50° C. (—4° and 122° F.).

Curves showing graphically the value of the correction factor are shown on plots 4 and 5, and charts for correcting for both temperature and barometric pressure are given on plots 10 and 11, the former being in metric and the later in English units.

Variation of Horsepower With Temperature

The horsepower of an internal-combustion engine varies with the temperature of the air admitted to the carburetor. In order to reduce the horsepower at any observed temperature to horsepower at a chosen standard temperature, it has ordinarily been assumed that the horsepower varies inversely as the absolute temperature of the carburetor air, other conditions being held constant.

In the testing of aeroplane engines at the altitude laboratory of the Bureau of Standards the horsepower at the observed carburetor air temperature has been reduced to arbitrary standard temperatures in order to furnish a common basis for comparing the results of different tests.

The tests used to determine the approximate variation of horsepower with temperature were all made on two Hispano-Suiza engines built by the Wright-Martin Aircraft Corporation, New Brunswick, N. J. The first engine, used in the majority of the runs, was of 150 horsepower, known as type A, while the remaining runs were made with the 180-horsepower, type E.

Three different carburetors were used, tests Nos. 79, 80, and 104 having been made on the 150-horsepower engine with the Claudel carburetor, test No. 103 on the same engine with the Tice carburetor, and tests Nos. 116, 117, and 119 on the 180-horsepower engine with the Stromberg carburetor.

The tests cover a wide range of altitudes from 2,000 to 30,000 feet, and for every change in barometric pressure the Claudel and Stromberg carburetors were adjusted by hand to give maximum power, but the Tice carburetor was an experimental one, designed for inherent altitude control, and was therefore not adjusted by hand. As the Tice carburetor differs radically from the others used in the tests, the agreement of the results in all cases indicates that the carburetor design may not greatly affect the magnitude of the temperature correction factor.

Tables I to VI contain the observed and computed data used in obtaining the correction factors.

To obtain an expression for the correction factor to reduce horsepower at a given observed temperature and pressure to horsepower at the arbitrarily chosen temperature of 0° C., and the same pressure, we have

$$HP_0 = HP_t \times F_0 \qquad (1)$$

in which HP_0 = horsepower at arbitrarily chosen temperature of 0° C.

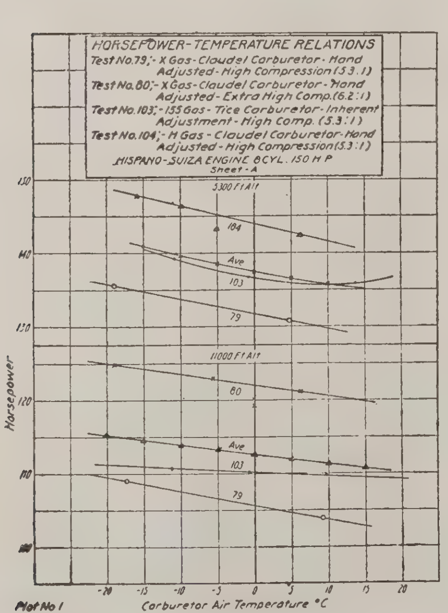
HP_t = horsepower at observed temperature t °C.

F_0 = correction factor to reduce to arbitrary temperature of 0° C.

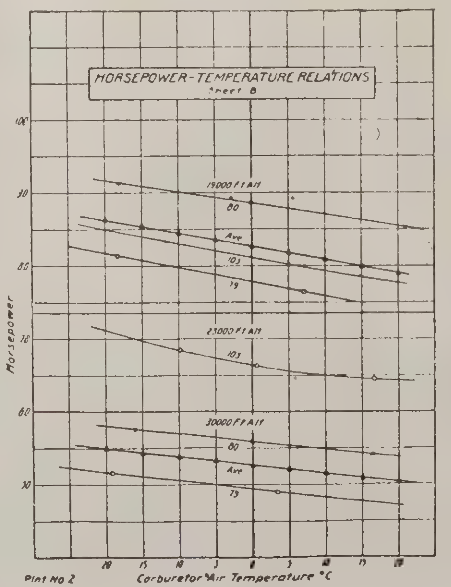
From (1)

$$F_0 = \frac{HP_0}{HP_t} \qquad (2)$$

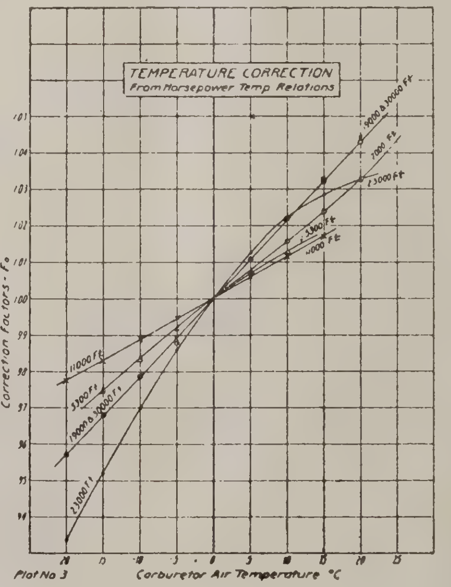
It is evident from equation 2 that the correction factors at the different temperatures for any given run depend upon an accurate determination of horsepower at the arbitrarily chosen temperature of 0° C. For this reason the horsepowers computed from the observed data were plotted against carburetor air temperatures and smooth curves drawn through as many of the points as possible, as shown on plots 1 and



Plot No 1



Plot No 2



Plot No 3

2. Tests at the same altitude have been grouped together and an average curve drawn for each group. From these curves the average horsepowers were obtained at 0° C, and the other observed temperatures of the given run, and from the values of horsepower thus secured the correction factors F_0 were determined by the use of equation 2. These factors, plotted against temperature, are given on plot 3.

Values of the correction factors obtained from these average curves (at the different altitudes) were averaged and plotted, giving the mean correction curve on plot 4. This curve may be represented by the equation:

$$F_0 = \frac{529+t}{529} \qquad (3)$$

in which t is the observed temperature of the carburetor air in degrees Centigrade. Combining equations 2 and 3, we obtain,

$$\frac{HP_0}{HP_t} = \frac{529+t}{529+0} \qquad (4)$$

which may then be written in a generalized form, substituting t_0 °C for 0 °C and t_2 for t, as follows:

$$\frac{HP_{t_1}}{HP_{t_2}} = \frac{529+t_2 \text{ °C.}}{529+t_1 \text{ °C.}} \qquad (5)$$

or

$$HP_{t_1} = \frac{529+t_2 \text{ °C.}}{529+t_1 \text{ °C.}} \times HP_{t_2}$$
$$= F \times HP_{t_2} \ (6)$$

where

HP_{t_1} is the horsepower at temperature t_1 °C., to which HP_{t_2} the horsepower at the temperature t_2 ° C., is to be reduced and F is the reduction factor.

F may therefore be written

$$F = \frac{529+\text{observed temp. in °C.}}{529+\text{correction temp. in °C.}} \qquad (7)$$

In order to correct horsepower at a given observed barometric pressure and temperature to horsepower at the actual temperature corresponding to the altitude of the given barometric pressure, it is necessary to know the mean actual temperatures existing at the various altitudes.

To obtain this relation the information contained in Aeronautic Instruments Circular No. 3, issued by the Bureau of Standards, was used, resulting in the altitude-temperature curves on plots 8 and 9.

As it is necessary for the purpose of comparison to correct an observed horsepower for both temperature and barometric pressure it is desirable to obtain an expression for a correction factor which shall include both corrections.

The results of numerous tests in the altitude laboratory indicate that for the ordinary slight differences in barometric pressure met with from day to day, the assumption that the brake horsepower varies directly as the barometric pressure is sufficiently accurate. The true variation of horsepower with altitude is, however, fully covered in Part I of this report.

Upon the assumption that the horsepower developed varies directly as the barometric pressure we have:

$$\frac{HP_1}{HP_2} = \frac{P_1}{P_2} \qquad (8)$$

or,

$$HP_1 = \frac{P_1}{P_2} \times HP_2 = F_1 \ HP_2 \qquad (9)$$

where,

HP_1 = Horsepower developed at correction pressure P_1.
HP_2 = Observed horsepower developed at observed pressure P_2.
$F_1 = \frac{P_1}{P_2}$, the barometric pressure correction factor.

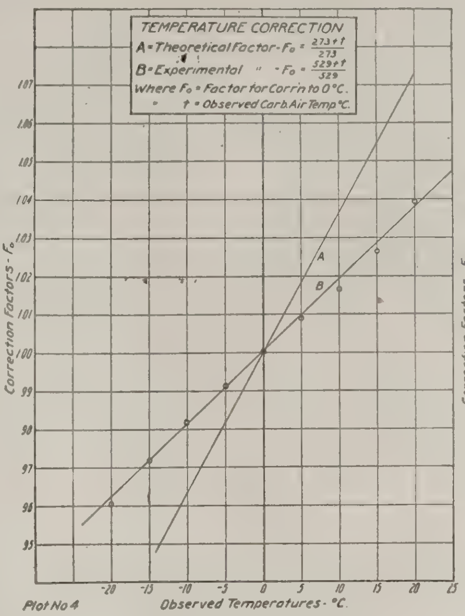
From equation (9) we get:

$$F_1 = \frac{\text{Correction barometric pressure}}{\text{Observed barometric pressure}}. \qquad (10)$$

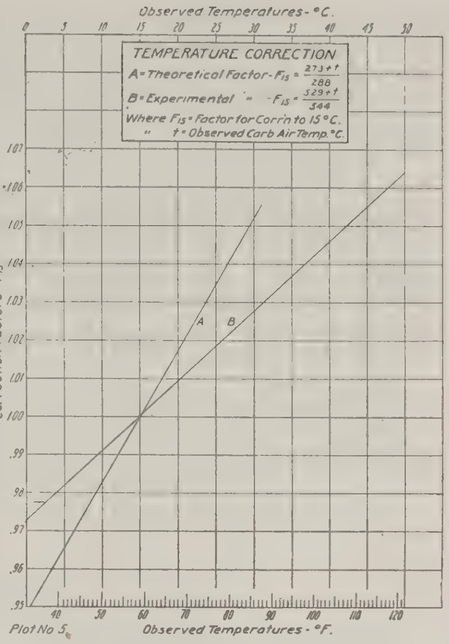
Combining the temperature and pressure corrections from equations (7) and (10) we obtain an expression for a factor F_1, to correct horsepower from observed temperature, and pressure to standard or correction temperature and pressure, as follows:

$$F_1 = \frac{529 + \text{Obs. temp. °C}}{529 + \text{Correct temp. °C}} \cdot \frac{\text{Correct baro. pressure}}{\text{Obs. baro. pressure}}$$

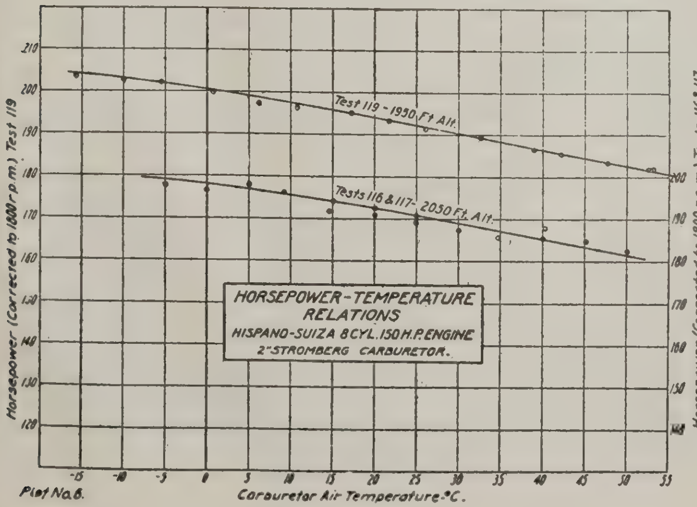
Plot 10 is constructed for obtaining this combined correction factor and is based on equation (11). To use this chart



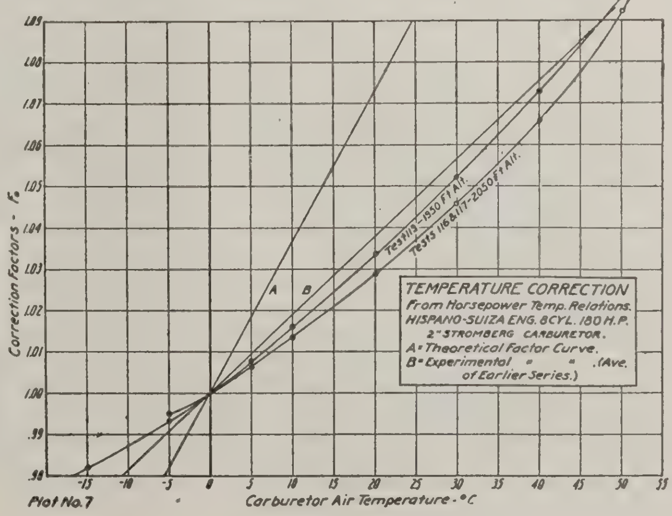
Plot No 4



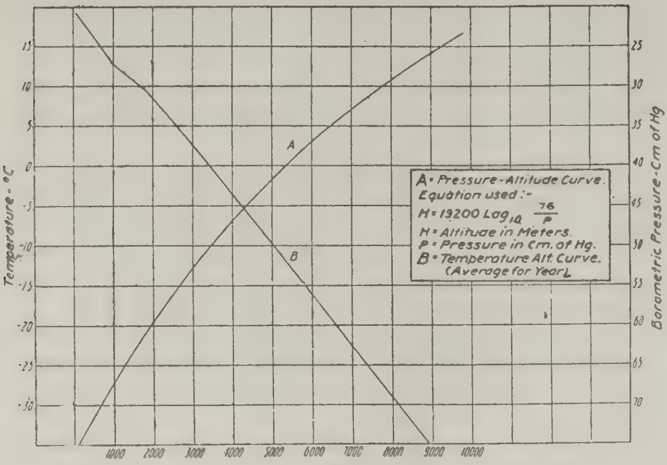
Plot No 5



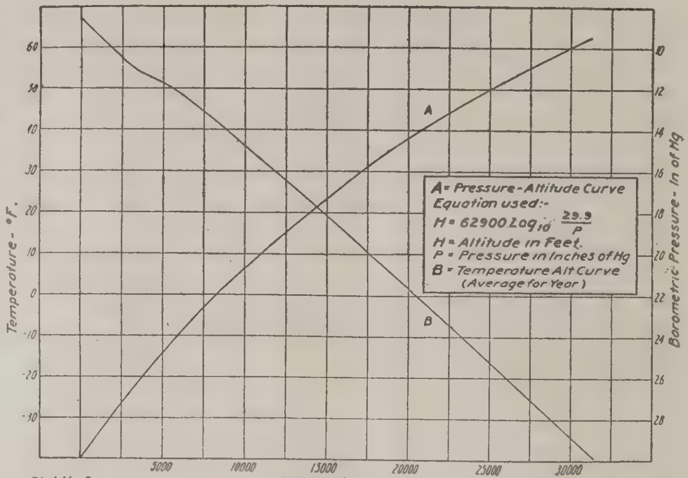
Plot No. 6.



Plot No. 7



Plot No. 8

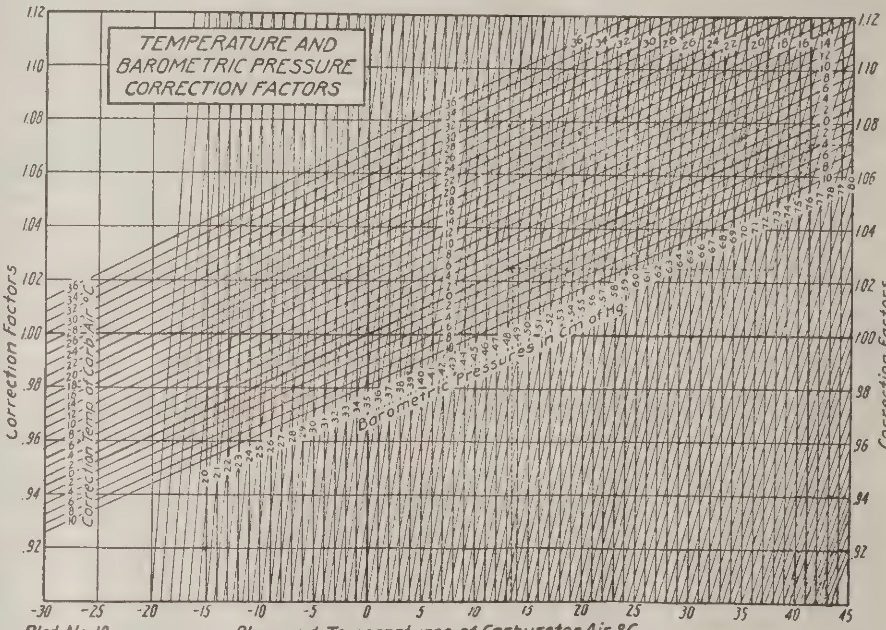


Plot No. 9

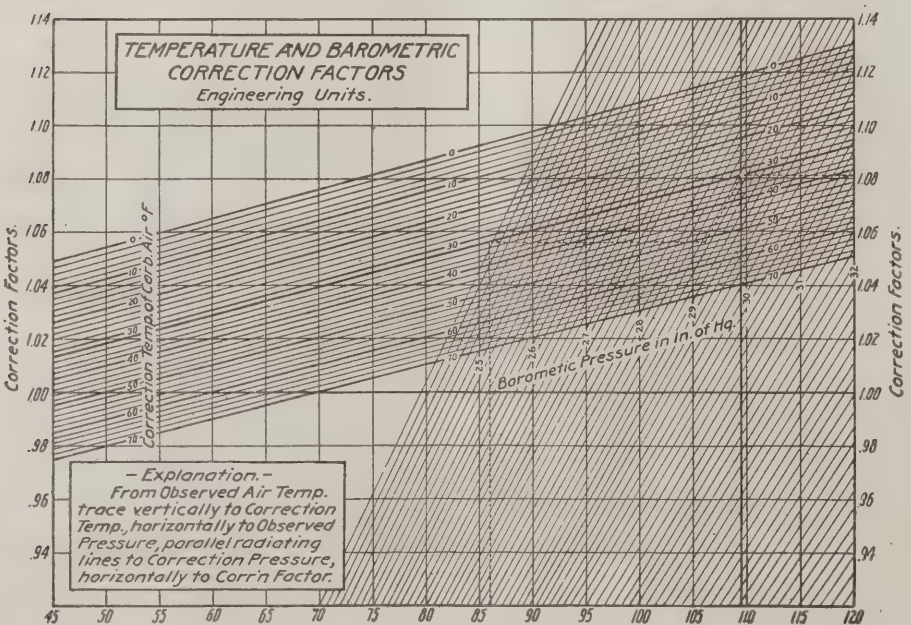
proceed as follows: Trace vertically upward from observed carburetor air temperature to line of correction temperature, then horizontally to observed barometric pressure. From there trace in direction of radiating lines to correction pressure, then horizontally to the line of correction factors.

Plot 11 is constructed in a similar manner for obtaining the combined correction factor in terms of temperature in degrees Fahrenheit and pressure in inches of mercury.

In using these charts it should be borne in mind that the majority of the tests upon which this report is based were made on only one engine and between temperatures of approximately—20° and 15° C. (—4° and 59° F.), respectively. However, the three later tests with the 180 horsepower engine were made between temperatures of — 15° and 50° C. (5° and 122° F), and the results, as given in Tables V and VI and on plot 6, check very closely to the average of the earlier runs. This is illustrated by the curves on plot 7, where the average curve as drawn on plot 5, is prolonged to include these higher temperatures.



Plot No. 10.



– Explanation. –
From Observed Air Temp. trace vertically to Correction Temp., horizontally to Observed Pressure, parallel radiating lines to Correction Pressure, horizontally to Corr'n Factor.

Plot No. 11.

It therefore appears safe to assume that this relation, expressed by the simple equation:

$$F = \frac{529 + t_2 \text{ °C.}}{529 + t_1 \text{ °C.}} \qquad \frac{920 + t_2 \text{ °F.}}{920 + t_1 \text{ °F.}}$$

which has been derived from tests at various altitudes on two engines equipped with three different carburetors, gives apparently accurate results for the type of engines considered within the experimental temperature range of —20° to 50° C.(—4° to 122 °F.).

TABLE I, TEST NO. 79.—*X gas, Claudel carburetor, hand adjusted, high compression (5.3:1).*

Altitude	Temperature of carburetor air	Dynamometer scale corrected for balance	Back pressure correction		Dynamometer scale corrected for balance and back pressure	Revolutions per minute	H. P at 1,500 revs. per minute at observed temperatures
			Height in Cms. of *H2O.*	Scale correction			
Feet	° *C.*	*Pounds*		*Pounds*	*Pounds*		
30,000	—19.0	103.0	....	....	103.0	1,490	51.5
	+ 3.3	98.0	....	....	98.0	1,490	49.0
10,100	—18.2	162.5	....	....	162.5	1,500	81.5
	+ 7.0	152.5	....	....	152.5	1,490	76.3
11,500	—17.5	218.0	....	....	218.0	1,510	109.0
	+ 9.0	207.5	....	....	207.5	1,490	103.8
5,450	—10.0	271.0	....	....	271.0	1,550	135.5
	— 0.3	263.5	....	....	263.5	1,550	131.8

TABLE II, TEST NO. 80.—*X gas, Claudel carburetor, hand adjusted, extra high compression (6.2:1).*

Altitude	Temperature of carburetor air	Dynamometer scale corrected for balance	Back pressure correction		Dynamometer scale corrected for balance and back pressure	Revolutions per minute	H. P. at 1,500 revs. per minute at observed temperatures
			Height in Cms. of *H2O.*	Scale correction			
Feet	° *C.*	*Pounds*		*Pounds*	*Pounds*		
11,600	—19.0	249.5	— 2.7	—0.1	249.4	1,494	124.7
	+ 6.2	242.0	— 2.15	—0.1	241.9	1,406	121.0
	— 5.5	245.5	— 4.2	—0.2	245.3	1,516	122.7
	0	238.3	— 4.3	—0.2	238.1	1,674	110.1
19,200	—18.0	182.4	+ 1.45	+0.1	182.5	1,488	91.3
	— 2.6	178.5	+ 3.3	+0.1	178.6	1,526	89.3
	+20.8	170.0	+ 3.0	+0.1	170.1	1,496	85.1
	0	177.0	+ 5.2	+0.2	177.2	1,524	88.6
20,750	—15.8	114.5	+15.5	+0.6	115.1	1,520	57.6
	0	111.0	+14.7	+0.6	111.6	1,558	55.8
	+16.2	107.6	+14.7	+0.6	108.2	1,500	54.1

TABLE III, TEST NO. 103.—*Tice carburetor, inherent adjustment, 155 gas, high compression (5.3:1).*

Altitude	Temperature of carburetor air	Dynamometer scale corrected for balance	Back pressure correction		Dynamometer scale corrected for balance and back pressure	Revolutions per minute	H. P. at 1,500 revs. per minute at observed temperatures
			Height in Cms. of *H2O.*	Scale correction			
Feet	° *C.*	*Pounds*		*Pounds*	*Pounds*		
5,300	—10.9	278.5	— 2.5	—0.1	278.4	1,505	139.2
	— 0.8	273.5	— 2.0	—0.1	273.4	1,518	136.7
	+13.6	271.5	— 3.0	—0.1	271.4	1,530	135.7
11,400	—11.2	221.5	—11.0	—0.4	221.1	1,503	110.6
	+ 9.6	219.2	— 1.0	0	219.2	1,498	109.6
	— 0.7	220.5	0	0	220.5	1,508	110.3
19,250	—11.6	166.5	+ 3.0	+0.1	166.6	1,508	83.3
	+ 1.0	161.5	+ 2.5	+0.1	161.6	1,503	80.8
	+14.7	157.5	—15.5	—0.6	156.9	1,500	78.5
23,170	— 9.7	136.5	+ 4.0	+0.2	136.7	1,510	68.4
	+ 0.6	132.5	+ 3.0	+0.1	132.6	1,488	66.3
	+16.6	129.5	—19.0	—0.7	128.8	1,483	64.4

TABLE IV, TEST NO. 104.—*H gas, Claudel carburetor, hand adjusted, high compression (5.3:1).*

Altitude	Temperature of carburetor air	Dynamometer scale corrected for balance	Back pressure correction		Dynamometer scale corrected for balance and back pressure	Revolutions per minute	H. P. at 1,500 revs. per minute at observed temperatures
			Height in Cms. of *H2O.*	Scale correction			
Feet	° *C.*	*Pounds*		*Pounds*	*Pounds*		
5,450	—15.8	296.5	—32.0	—1.2	295.3	1,520	147.6
	— 9.9	293.5	—33.0	—1.3	292.2	1,525	146.1
	— 5.0	287.5	—34.0	—1.3	286.2	1,515	143.1
	— 0.1	272.0	—20.0	—0.8	271.2	1,507	135.6
	+ 6.2	285.5	— 7.5	—0.3	285.2	1,530	142.6

TABLE V, TESTS NOS. 116 AND 117.—*Two-inch Stromberg carburetor, hand adjusted, high compression (5.3:1), X gas, altitude 2,050 feet.*

Temperature of carburetor air	Dynamometer scale readings	Revolutions per minute	Horsepower at 1,800 revs. per minute at observed temperatures
° *C.*	*Pounds*		
— 5.0	328.0	1,800	196.8
+ 0.2	326.3	1,800	195.8
+ 5.2	329.0	1,793	197.4
+ 9.4	326.0	1,790	195.6
+15.3	323.0	1,800	193.8
+20.1	321.0	1,795	192.6
+40.2	312.2	1,798	187.3
+50.0	303.5	1,806	182.1
+45.1	307.0	1,803	184.2
+40.0	309.0	1,800	185.4
+34.5	308.2	1,810	184.9
+30.0	310.8	1,803	186.5
+25.0	314.0	1,800	188.4
+20.1	317.0	1,813	190.2
+14.9	318.0	1,820	190.8

TABLE VI, TEST NO. 119.—*Two-inch Stromberg carburetor, hand adjusted, X gas, high compression (5.3:1), altitude 1,950 feet.*

Temperature of carburetor air	Dynamometer scale readings	Revolutions per minute	Horsepower at 1,800 revs. per minute at observed temperatures
° *C.*	*Pounds*		
—15.5	33.73	1,810	202.4
— 9.9	336.7	1,800	202.0
— 4.5	335.3	1,800	201.2
+ 0.7	332.0	1,795	199.2
+ 6.1	329.0	1,797	197.4
+10.9	326.0	1,815	195.6
+17.3	324.0	1,815	194.4
+21.7	321.0	1,820	192.6
+26.0	318.0	1,815	190.8
+32.5	315.0	1,795	189.0
+38.6	310.0	1,805	186.0
+42.0	308.5	1,800	185.2
+47.5	305.0	1,800	183.0
+52.8	302.5	1,795	181.5
+52.4	302.5	1,797	181.5

(*Continued from page* 148)

Supplying Spare Parts for Surplus Aeroplanes Affords a Huge Business

"Supplying spare parts for surplus aeroplanes affords a huge business. Lacking spare parts for even the common Curtiss training aeroplane, was almost tragic during the past six months and caused extensive trouble and loss of time to the people who had bought the 2,000 Curtiss Training aeroplanes (including the Canadian plane) during the past nine months.

"The demand for these spare parts was so great and pressing that aviators finally actually had to resort to these assembled complete aeroplanes so as to have a few spare parts to keep other aeroplanes in operation.

"Supplying spare parts for 20,000 surplus aeroplanes of different types will create substantial business and will be a contributing factor to establish the aeronautic endeavors on a self-supporting permanent basis."

"Changing aeroplanes from wheels to skids wherewith to fly will in itself provide business for several factories. Provided the aeronautic movement is permitted to develop unrestricted and reasonable attention is given to establishing aerodromes there will be a sufficient number of aerodromes in operation by next winter to popularize winter flying."

Production of Large Seaplanes for Transportation Over Water Not Yet Begun

Producing large seaplanes over water would keep busy a score of large factories and these factories would have to be almost as large as ship building yards. The flying boats being planned by the U. S. Navy to be constructed this year are three times as large as the famous NC seaplanes which flew across the Atlantic and Caproni, the noted Italian manufacturer, who constructed a 25-ton seaplane to carry 50 passengers, affording them comfort and convenience such as is obtained in first class steamers, has designed and is going to build possibly in the United States a larger air liner to be equipped with 12,000 horsepower and to carry from four hundred to five hundred people. In other words, aircraft are reaching such tremendous sizes that they have to be built in huge factories, like ships of the sea.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. AERIAL AGE *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

..The reports of the Frear Committee will be printed first, in full. *As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigation Committee summarized in* AERIAL AGE *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Disque's Army of 30,000 Men

It has been difficult to secure data regarding the exact number of soldiers in the Northwest and their various employments, but it appears that in May, 1918, the number under Col. Disque reached 11,000 or 12,000. On November 1, 1918, the following disposition of troops existed, according to official records (p. 3689):

Cut-up plant, Vancouver, Wash	4,312
Disbursing quartermaster	9
Quartermaster	46
Portland headquarters	333
Medical Department	607
Logging and milling companies	17,571
Transportation unit	349
Loyal Legion	81
At cantonment	4,813
Total	28,121

This statement, the committee understands, does not include some 1,200 officers, many of whom were stationed at the eight-story palatial Portland headquarters. Col. Kelly, who was doing remarkable work for the American forces in France during this same period, had not to exceed 24 men at his camp headquarters (p. 2317).

In a book issued by the Spruce Production Corporation, the number of troops under Col. Disque were 27,661 enlisted men and 1,222 officers, or a total of 28,883, of which 536, including 132 officers, were at Portland headquarters and 356 other officers and 9,052 men were at Vancouver Barracks, five miles distant.

Col. Disque's army in the woods and soldiers at the cut-up plant and others in the above list, reaching about 23,000 or over, received civilian pay, reaching from $3.50 and upward to $8 per day, including compensation fixed by Congress, according to Director Ryan, which was paid by the Government. In the judgment of the committee, this was without any authority of law or other justification.

An estimated average of 15,000 troops were paid approximately $50 extra pay per month from the Government for six months, or from May 1 to November 1, 1918. This is believed to be a conservative estimate, but reaches a total illegal payment by Government officials of $4,500,000.

Soldier's Pay Fixed by Congress

In this connection the minimum pay of enlisted men per month in the Army was fixed by Congress at $30, or double the old rate. (Sec. 10, act of May 18, 1917.)

Revised Statutes 1765 provide:

> No officer in any branch of the public service or any other person whose pay salary or emoluments are fixed by law or regulation shall receive any additional pay, extra allowance, or compensation in any form whatever for the disbursement of public money or for any other service or duty whatever unless the same is authorized by law and the appropriations therefor specifically state that it is for such additional pay, extra allowance, or compensation.

Act 23, Army regulations 169, provide:

> Enlisted men . . . will not be employed on extra duty in time of war nor in time of peace for labor in camp or garrison which can properly be performed by fatigue parties. . . . Payments made in violation of foregoing rules will be charged against the officers who ordered the details. Duty of a military character must be performed without extra compensation.

Section 170:

> Enlisted men on extra duty are entitled to 35 cents per day.

After farming out the soldiers of this Army in the Northwest for six months or more in violation of law, the War Department called upon the Adjutant's General's office for an opinion as to the authority of the War Department to pay soldiers the prevailing civilian wages. The Judge Advocate General's office rendered an opinion to the Secretary of War in the matter, under date of September 11, 1918, holding that the War Department had acted within its powers. The case cited to sustain this opinion is United States *v.* Saunders (120 U. S. 126). An examination of the record in that case discloses that it has no application to the matter in hand. In that case it was held that a clerk in the office of the President of the United States, who was also appointed to be the clerk of a committee of Congress, and who performed the duties of both positions, was entitled to receive the compensation appropriated and allowed by law for each.

It was also held that Section 1765 of the Revised Statutes of the United States has no application to the case of two distinct offices, places, or employments, each with its own duties and compensation, but both held by one person at the same time.

On page 129 the court says:

> We are of opinion that, . . . the purpose of this legislation was to prevent a person holding an office or appointment, for which the law provides a definite compensation by way of salary or otherwise, which is intended to cover all the services which, as such officer, he may be called upon to render, from receiving extra compensation, additional allowances, or pay for other services which may be required of him either by act of Congress or by order of the head of his department, or in any other mode, added to or connected with the regular duties of the place which he holds.

We have examined this matter carefully because there is a principle involved in this unlawful exercise of power by the War Department, which the Congress of the United States cannot overlook nor condone. The Government is entitled to the full time of a soldier in the service in time of war at the compensation fixed by the Congress of the United States. The War Department has absolutely no authority to fix and pay out of Government funds, other and additional compensation than that fixed by congressional enactment. We are of the opinion that the Secretary of War and other high officials of the War Department, who were instrumental in making this unlawful expenditure of public funds, should be held strictly accountable therefor. It is high time, even in time of war, that all officials of the Government should be made to understand that they must respect and uphold and enforce the laws of the United States, and particularly those laws relating to the expenditure of public funds.

Discrimination Among Soldiers

Your committee has not sought to decide what motive was at the bottom of this unprecedented situation, but we believe that this farming out of soldiers was absolutely unjust to our soldiers, whether serving in Oregon or at the front in France, and an illegal assumption of authority by all concerned, and an unlawful expenditure of public money. Congress alone can determine the pay of soldiers and Congress alone can authorize payment from the Treasury. Millions of dollars were paid unlawfully by the Government to cost-plus contractors for civilian pay of soldiers on orders of Col. Disque, approved by Director Ryan and the Secretary of War.

If it was right to prevent over eight hours' work and compel the Government to pay cost-plus operators civilian wages for soldiers in Oregon and Washington in time of war and critical national danger, then it must have been right for Secretary of War Baker to have restricted to eight hours per day the fighting of American troops in the trenches.

If it was wrong for our soldiers to exceed union hours, or receive less than union scale wages, while in the mills and forests of Oregon, then it was wrong in the mills and forests of France.

If the policy agreed to by Messrs. Baker, Gompers and Disque in the western zone of safety during time of war and of unprecedented sacrifice had been the policy of Col. Kelly in his lumbering in France, or Gen. Pershing in his military operations overseas, then America and her soldiers probably would be fighting in Flanders to-day.

(*To be continued*)

NAVAL and MILITARY AERONAUTICS

Flyers Sail to Bring the R-38 Here

The naval air crew chosen to fly the United States Navy's new giant dirigible airship across the Atlantic Ocean from England, have sailed. The crew consists of three officers and eighteen men, but two officers are already in England. The new dirigible is the R-38, a sister ship of the famous R-34, which made a round trip flight across the Atlantic Ocean last year. The R-38 was built for the British Royal Air Force, but was sold to the United States Navy following the signing of the armistice.

Aero Gun to Be Tested

A new type of aero gun, which discharges one-pound projectiles at the rate of 100 a minute, will be tested at Bolling Field, Anacostia. The gun, which is a development of a similar gun used by the French in the world war, was built by a Baltimore ordnance company.

It weighs about 230 pounds and is placed in the bow of the aeroplane. A special crew is in training for the test.

Naval Aviators Training to Fly Land Planes

A class of seven naval officers in charge of Lt. Comdr. E. W. Spencer, Jr., U. S. N., are taking a course of instruction at March Field, Cal. This is the second class of naval aviators to train at this field.

The present course consists of ground instruction on the Hispano Suiza and Liberty motors, instruction on the Lewis and Marlin machine guns, and Radio Instruction. The flying includes a complete Gosport course on the Curtiss J. N. 6H., a transition course on the Thomas Morse Scout and a finishing course in aerial combat in the S. E. 5, equipped with the camera gun.

The present class is composed of: Lt. Comdr. E. W. Spencer, Jr., U. S. N.; Lt. (J. G.) Geo. R. Pond, U. S. N. R. F.; Lt. (J. G.) Guy McLaughlin, U. S. N.; Lt. (J. G.) E. H. Barkelew, U S. N, R. F.; Lt. (J. G.) A. C. Lake, U. S. N. R. F.; Lt. (J. G.) T. Burke Lee, U. S. N. R. F.; Ensign E. E. Reber, U. S. N.

New Martin Transport Makes 115 Miles Per Hour

The Martin twelve passenger transport aëroplane was flown recently to Washington from Dayton, Ohio, by Lieut. Harold R. Harris, of the Flight Test Branch. He was accompanied on this flight by Lieut. A. L. Smith, Lieut. E. B. Koger, of the Navy, and M. S. E. Clarence B. Coombs. The distance from McCook Field, Dayton, Ohio, to Bolling Field, Washington, D. C., is 385 miles by air, which was flown in 3 hours and 21 minutes at the rate of 115 miles per hour.

The distance in railroad miles between the two cities is 500 miles, and is made in 17 hours by the fastest scheduled express time which is approximately 30 miles per hour. The aeroplane beat the train by 85 miles per hour, saving exactly 13 hours and 39 minutes.

During the flight, Lieut. Koger expressed his desire for food. Sgt. Coombs acting as steward, immediately produced the necessary viands which were much relished by all.

Reserve Officers to Receive Flying Training at Army Pilot's Schools

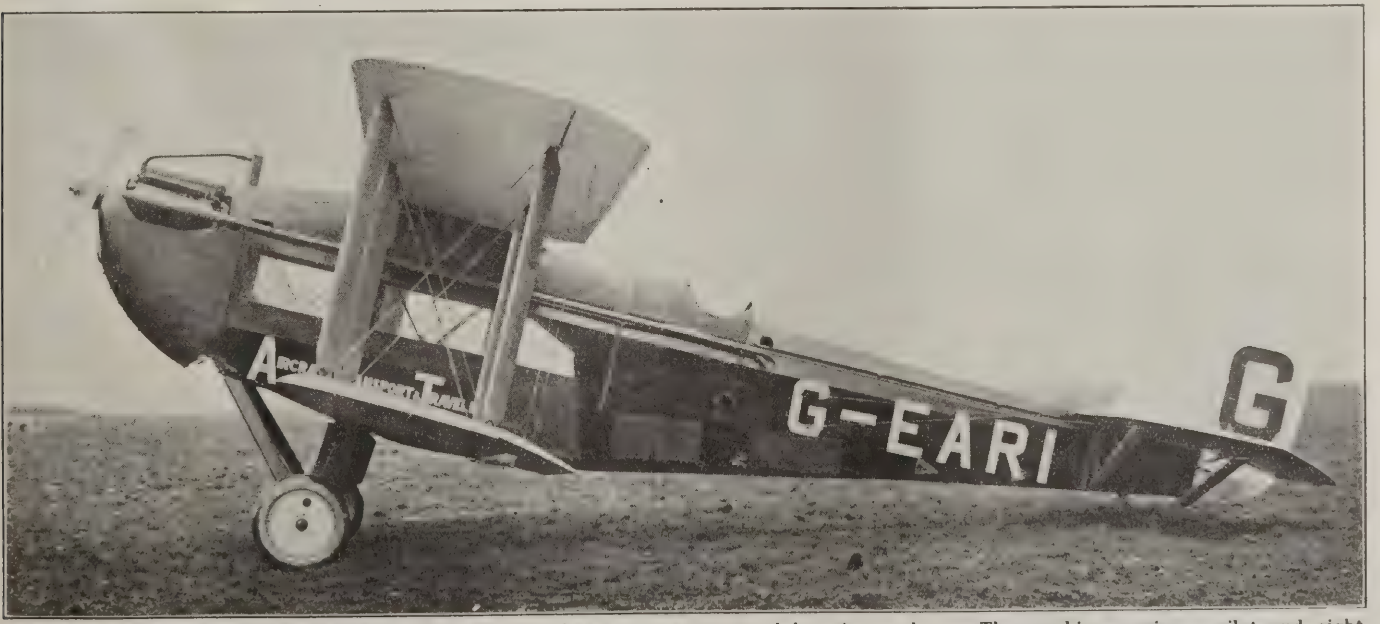
There have been organized at various colleges and universities throughout the United States a number of aero clubs whose members are commissioned reserve military aviators on the inactive list. These reserve officers want to keep in flying training and desire to establish units of the Air Service at the colleges and institutions similar to those being conducted by other arms of the Service in connection with R. O. T. C., and that training be given them in aeronautical engineering.

Under the policy established in the Air Service early in 1919, the commanding officer at any Air Service station where flying is authorized, may, at his discretion, permit qualified reserve military aviators to take such practice flights and training as in his opinion he may deem advisable. Flying under this authorization is subject to the restrictions that cross country flights will not be made and no interference will be permitted with the regular training or operation of any flying field.

It is not contemplated to establish units in conjunction with colleges and universities or to conduct them along lines similar to the R. O. T. C. units of other arms of the Service at this time. Both from the point of economy and safety in training it is felt that all flying training throughout the United States, which the Government plans doing, should be carried on at one of the designated pilot's schools, which will be entirely under government jurisdiction.

The Air Service is heartily in accord with the program of conducting ground training courses of aeronautical engineering at the colleges and universities having units of reserve officers training corps, and is willing to assist in the establishment or conduct of such courses by loaning a limited number of aeronautical engines in connection therewith.

It is the hope of the Director to maintain former flying personnel now on the inactive list in such condition of training as to make them available for immediate duty in the event of another emergency.



A new type of Airco London-Paris "aerial express," which has a very roomy and luxurious saloon. The machine carries a pilot and eight passengers, or a pilot and a ton of mail or express, at an average speed of 100 miles an hour. It is powered with a Napier-Lion, 450 H.P. engine

FOREIGN NEWS

Cairo to Cape Town Airflight Finished

London.—The Air Ministry announced a few days ago that the Cairo to Cape Town aerial flight was completed by the arrival of Col. Van Rynzvold and Major Brand in a Vozrtrekker machine, supplied by the Union of South Africa Government to replace the wrecked Silver Queen.

An Advisory Committee in France

The Under-Secretary of State for Aerial Transport in France has appointed an Advisory Committee for Aeronautics, to consider various technical problems in connection with aviation. It is modelled very much on the lines of the British Committee, and will comprise representatives of the Government Departments, the French Aero Club and the Manufacturers' Association. The chairman is Engineer-in-Chief Fortan, of the Section Transport Aériens.

The Leeds to Holland Service

The experimental flight of Mr. Kenworthy on his Blackburn (Rolls-Royce) Kangaroo from Leeds to Holland and back proved so successful that, in response to the wishes of the Amsterdam Textile Association, the North Sea Aerial and General Transport Company has decided to organize a weekly service. On its trip to Holland the machine carried a load of ladies' costumes, while it brought back 1,200 pounds of aniline dyes.

Commercial Aviation in South Africa

The British Air Ministry is informed by the Acting High Commissioner for South Africa that the Government of the Union desires to offer every encouragement to the development of commercial aviation in the Union of South Africa.

The Government of the Union proposes, if possible, soon to introduce legislation which, in connection with the proposed revision of the Customs Tariff, will, it is hoped, give material aid with reference to aeroplanes of British manufacture.

Flying in the Bermudas

A combined company has lately been formed to promote flying in the Bermudas. The aeronautical firms interested in it are Messrs. A. V. Roe & Co., Ltd., the Supermarine Aviation Works, Ltd., and Beardmore Aero Engines, Ltd. This association of a seaplane firm, a flying-boat firm, and an aero-engine firm is extremely interesting. It is further understood that associated with this enterprise is the firm of Furness, Withy & Co., Ltd., who have large interests in Bermuda.

In charge of the actual flying operations will be Majors H. H. Kitchener and H. Hemming, A.F.C., both distinguished ex-squadron commanders of the R.A.F. Already two Avro seaplanes have arrived in the Bermudas, and pleasure flying has already begun.

Two Supermarine flying boats are also on their way out, and when they arrive more extended flights out to sea can be undertaken. Probably it will also be found useful to take pilots out to the ships, as, owing to the numerous coral reefs, it takes a tug a long time to get out of harbor. Business, it is thought, may also be done by the flying boats for the bunkering companies.

It is also proposed to undertake an aerial survey of the islands. This has never been done before, and there are numerous submerged reefs which have never been charted. The aerial camera will disclose their exact position in the most speedy manner.

Dispersing the Sudanese with Aeroplanes

A patrol sent by the Sudan Government recently against the Nuers in the Baro district, who had been raiding, found a large hostile party in a difficult position, but aeroplanes very successfully dispersed them, thereby avoiding the necessity of undertaking some troublesome operations. The patrol continues its work, but the co-operation of the aeroplanes appears to have considerably facilitated its task.

15,576 Pilots in France

The total of aeroplane pilots' certificates issued in France now stands at 15,576, of which 1,732 were issued in 1919. The number of airship pilots' certificates totals 43, of which 12 are dated 1919, while balloon pilots number 448, but only three qualified last year.

France Lays Plans for Aerial Routes

New York—Six international aerial routes have been proposed by France, according to a recent announcement by M. Flandin, Under-Secretary for Aeronautics of that country, the details of which have just reached this countdy. State subsidies, the information sets forth, will be granted to French companies employing French pilots and mechanics, and landing places will be established on air routes throughout France. These will be mapped out by the State Director of Aerial Navigation.

The proposed international routes are as follows:

Paris-Abbeville (for London)
Paris-Tours-Angouleme-Bordeaux-Bayonne (for Spain)
Paris-Valenciennes (for Brussels)
Paris-Strasbourg (for Central Europe)
Paris-Dijon-Lyons-Marseilles-Baléaric Islands (for Algiers)
Paris-Nice-Corsica (for Tunis).

Flies Across the Sahara

Paris.—Major Vuillemin, who has been making a flight across the Sahara with Lieut. Chalus, has reached Segou on the Niger. His motor being slightly damaged, he remained at Segou for 48 hours before resuming his flight to Dakar, a distance of 780 miles.

Major Vuillemin completed his flight across the desert on March 18, when he arrived at Gao. He then proceeded up the Niger to Bourem and finally reached Timbuctoo, which he left on March 21, after a short stop.

Promote Swedish Aerial Lines

Two aerial line companies offering service between Sweden and Finland are in course of formation, according to dispatches from Abo, Finland, published in recent issues of London newspapers. Of the two companies, one, the Svenskt Luftrafikbolag, is supported by Swedish capital, while the second, the Flygkompaniet, is being backed by English interests.

Royal Air Force Gets $101,000,000

The Royal Air Force of Great Britain will have a force of 29,730 men and the total expenditures will be £21,056,930—roughly $101,000,000 at the normal rate of exchange—for the fiscal year 1920-21. These estimates, which have just been issued in the form of a White Paper, include the sum of £894,540—nominally something less than $4,500,000, for civil aviation and a further item of £500,000—about $2,500,000—as "rewards for inventors."

These estimates, although a heavy reduction from the totals for the present fiscal year, evidence the feeling of necessity in England for a continuation of aeroplane development. Roughly, the proposed expenditure is one-third of that for the present year and the force of officers and men something like one-fifth of the 1919-20 strength.

The importance of the White Paper is that Great Britain finds it valuable to continue a heavy aviation force because of the continuing necessity for research, experimentation and the building up of commercial routes. The experimental and research activities are given £2,575,540 and the amount for technical stores is placed at £6,172,850. The Air Ministry is allotted a sum of £877,000.

The amount for works, building and land for military service is £3,647,000, while under the same heading for civil aviation is £415,000, of which more than a third will be expended for the development of aerial routes. Two other interesting items are those providing £28,500 for flashing lighthouses and £315,000 for the airship constructional establishment.

A Prize for Variation of Speed

The Parisian daily news-sheet, *L'Auto,* has offered a prize of 10,000 frs. for the French aviator flying a French aeroplane who makes the greatest variation of speed in flight and lands in the shortest space. The regulations have been drawn up by the Aero Club de France, and are in essence as follows:

The competition is open from April 1st until July 1st, 1920, and only French pilots flying machines made in France by a French company may enter.

The trials must be made in a wind of less than 10 metres a second, and made in the normal manner of flight without acrobatics. They will take place over a 3-kilometre course at Villacoublay, one horizontal flight in each direction being made at maximum and minimum speeds without an intermediate landing. Each entrant will be entitled to three attempts, which need not take place on the same day. The same useful load must be carried throughout and the variation of speed may only be made by the pilot whilst in flight. The trials will take place at a height of about 500 metres, and the machine must carry an officially checked barometer registering to 1,000 metres.

The length of run on landing will be measured between the point where the wheels first touch and a perpendicular line passing through the wheel centre taken at the final resting-place.

Entries will be received up to March 31st, 1920.

Plan Extensive Aerial Service in France

The Messageries Aeriennes expect to have a minimum of fifty machines in the air per diem on regular transport lines this summer. The Paris-Lille-Brussels line reopens at the end of March and will probably have an alternate day extension to Amsterdam and Cologne to link up with Scandinavian and German lines. There will be another line into Switzerland branching from Lyons and one into Italy from Marseilles, also possibly one from Marseilles to Toulouse to link up with the Bordeaux and Morocco lines which are now in operation. The Paris-Cabourg-Trouville line will reopen as soon as the season commences.

The Société de Sud-Ouest are reopening the Bordeaux-Biarritz-Sanscbastian-Bilbao line at the end of March.

The Transaeriennes Company, in addition to the Paris-London line, intend operating Paris-Lyons-Marseilles and Paris-Strasbourg, together with daily trips to various points on the old battlefields, using both aeroplanes and airships. This latter work is being done in connection with Thomas Cook and Son and the American Express Co.

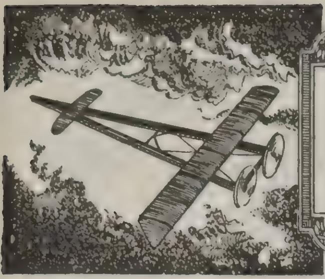
The French Civil Aviation Department estimates thatt with the summer resort business there will be at least 500 machines in the air per diem from May to the end of September, and of the privately owned machines there will be about a hundred in service, chiefly small machines, such as Farman "Davids," H. Potez "Type VIII," Caudron G-3 (with ailerons), and Besson triplane flying-boats.

A Swedish Height Record

Von-Segebaden, a Swedish military flying officer, has established a new Scandinavian height record, reaching 6,200 metres (20,342 ft.), in 48 minutes.

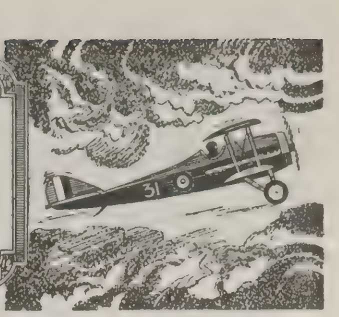
The Monaco Meeting

Owing to delays caused by the railway strike, it has been decided to postpone the opening of the Monaco meeting from April 1 to April 9, and, in consequence, there will not be a week's interval between the motor-boat racing and the aviation events. The entries for the Grand Prix of Monaco comprise two Donnet D 10 (Hispano-Suiza), flying-boats, two Caudron, C 37 (Rhone), seaplanes, one Nieuport (Sunbeam) seaplane, one Caudron, C 39 (Rhone), seaplane, one Breguet 18 (Breguet) seaplane, one Fairey III (Napier) seaplane, two Savoia (San Giorgio) flying-boats, two Liore and Olivier (Salmson-Hispano) seaplanes, two F 3 (Rolls-Royce) flying-boats entered by the Portuguese Navy, two Spad 31 (Hispano-Suiza) seaplanes. The entrants for the speed and altitude competitions are the same except that the Nieuport is replaced by two Hispano-engined machines and the F 3 flying-boats are not included. All the machines are of the biplane type.



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon



Man-Carrying Gliders

The two illustrations shown below are of gliders of the biplane type, but different in design. The one on the left was constructed some years ago by members of the Buffalo Aero Science Club. It has a 20 ft. spread, is 12 ft. long, 4 ft. 2" chord, 4 ft. gap. The planes have a stagger of 4 inches and the stabilizer which is triangular in shape is set at an angle of minus 4 degrees. It is original in design and has flown successfully many times.

The one on the right is a new and novel idea in glider construction and was built by Harry B. Tonking, Dover, N. J. If the reader will study the illustration he will notice that the usual number of interplane struts have been reduced to only six which cuts down head resistance and saves work in making fittings, etc.

The construction is a new departure in glider building and should be adopted by those who are doping out plans for building one this season.

The glider is really a motorless aeroplane as it is built exactly like one except for the fact that it is not propelled by a motor but is given an initial forward push by the operator running into the wind or pulled by a person, horse or automobile. The horse and automobile are dangerous unless some means are provided to allow the operator to disconnect the pull ropes if he should get into difficulty. The best method is to select a high ground and run into the wind until enough speed is attained to give sufficient lift to the planes, and the operator is off the ground. He then controls the machine by moving his body to the left, right, front or rear, to maintain horizontal flight. To do this correctly requires practice, after a few hours one can become proficient and long flights can be made.

A glider must be constructed of the lightest materials, those which are of the maximum strength because it must be light enough to be carried easily and strong enough to hold together in the air. For this reason the monoplane type of glider is out of the question because it must be braced stronger and the wing spars are heavier, than for the biplane.

The wings of a glider are built up of two spars 1¼" square, having rounded corners and over these are laid ribs built up by glueing two strips of ½x3/16" spruce together and while the glue is setting they must be kept in a form that will hold them in a curve to form a wing curve of any desired shape. They are them screwed to the spars with spaces of 12" between each rib.

The front spar is also the entering edge.

The trailing edge is simply a strip of piano steel wire.

The covering is the cheapest grade of unbleached muslin and is fastened to the upper surfaces of the planes only. The fabric is fastened to the front spar, underneath, by brass tacks and carried over the top and then to the trailing edge where it is bent around and sewed by hand. The fabric is then doped with aeroplane dope and a coating of spar varnish over this.

The tail surfaces are covered the same way and care should be taken to get them as light as possible.

The interplane struts are made of spruce 1½x¾" streamlined and the outriggers of bamboo poles ¾" diameter.

The interplane bracing is solid piano wire and bicycle spoke turnbuckles.

A space is left in the center of the lower plane for the operator to move around and strong supports of say 1" square ash, with upholstery or padding to permit the operator to hang on with the support under the arm pits.

The Aeronautic Library sells a book on the construction of a 20 ft. glider, and I would advise the readers to get this book if they intend building one.

Model Aviation Exhibition and Tournament, New York State Drill Hall, April 10, 1920
Aero Club of Ithaca, Ithaca, New York

Rules

I. Contests shall be open to all.

II. The entries are free and should be sent in writing to the Contest Committee. Each contestant should state the particular contests in which he wishes to make entry.

III. Contests shall be divided into two classes, Senior and Junior.

(1) Entrants over 16 years of age shall be considered Seniors;

(2) Entrants 16 years of age or under shall be considered as Juniors.

IV. Models must be built by entrant.

V. Models shall not be limited in size, weight or type, but power must be self-contained.

VI. Any entry shall be allowed three trials, the best flight being credited as official.

VII. Any contestant not ready to commence his trial when called upon by the starter shall forfeit his turn.

(1) In exceptional cases, the judges shall have full power to allow additional trials or time to any entry.

VIII. The flight of a model which strikes an obstruction, retarding its flight or fall except momentarily, shall be considered ended.

IX. All measurements of time and distance shall be taken from the point of taking off to the point of landing.

(1) Distance shall be measured in a straight line between these points.

X. In case any parts of models become detached on landing, the nearest point of fuselage shall be considered the measuring point.

XI. No power other than that self-contained shall be allowed in starting R.O.G. and Hydro models.

(1) In Glider contests, no force other than gravity shall be used in starting the models.

XII. The contest shall be controlled by the Contest Committee.

(1) Floor officials shall be:

(a) One starter.
(b) One recorder.
(c) One entry clerk.

XIII. The winning models of the various contests shall be decided upon by a committee of three judges consisting of disinterested persons. In all cases, the decision of the judges shall be final.

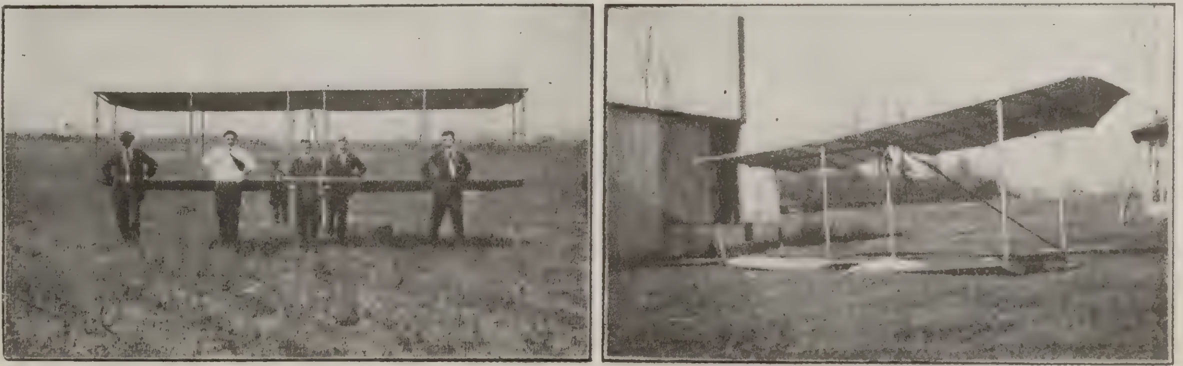
XIV. A list of events will be furnished in conjunction with these rules to any one desirous of making entry.

XV. Preliminary trials will be held on March 28th. All persons wishing to try out models must communicate with the Contest Committee before that date.

Address all inquires to

CONTEST COMMITTEE,
Aero Club of Ithaca,
Ithaca, N. Y.

Two Gliders of the Biplane Type



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Extra! Plans for Aeroplane Terminal

Where will New York land its air tourists?

Before long Chicago hog salesmen, Milwaukee two per centers, Boston garter drummers, Texas oil operators, film distributors from Los Angeles, college students from Ann Harbor and Yale, and titled globe trotters or base runners from the league of nations will be visiting the big city by the bird route, and they've got to have some place to step off.

Telegraph poles, church steeples, sturdy oaks, and slate roofs are no longer popular with air travellers; the era of the hospital as the air route terminal is over. Something has got to be done.

What and how and when and where are the only problems holding up the work in the slightest degree.

Roofing over Manhattan was suggested, but this was traced to a conspiracy on the part of the roofing trust. Then again somebody figured that by the time the job was completed airplanes would have been perfected to a degree where they would fold up and land in hat checking booths. And the great army of land dwellers protested that the roofing plan was another stab at personal rights, the personal right of every man to gaze up at the sky and see if it looked like rain or snow.

Battery Roof Protested

Roofing over the Battery was also talked of, but this was opposed on the ground that it would deprive the acquarium fish of their sun baths. Landings on hotel roofs are being talked of, but the chief drawback is the shortage of nets in Fire Department to care for those air joy riders who might skid into Broadway, going or coming—or both.

So the whole matter is still very much up in the air. Which is, after all, where it belongs.

Aircraft enthusiasts insist, however, that one of these fine mornings you'll get up and read all about the opening of a Penn. station at 2,500 feet. There'll be less trouble landing by airplane and getting to the street level than there is reaching it from the Grand Central train shed or the Times Square shuttle, they say. Not that that is very cheering. There will be no green lines to follow it, it is specifically guaranteed, however, and that promise certainly qualifies as the best news since the armistice and the report that the kaiser is a very sick man.

Patience, Airman, Patience!

But until that fine morning comes we airmen have got to fret along as best we can. Many suggestions are being heard in the meantime. The old plan to have rubber replace asphalt for street paving purposes is again being advanced, it being figured that one could step right out of a plane at any height and suffer nothing beyond a few gentle bounds. Shock absorbers, which could be worn around the neck and feet before stepping from the Spad into the atmosphere, are also being boomed.

An aerial tube or subway also has its backers in and out of Mattewan, the idea being to construct a huge chute system over the rooftops with large funnel entrances into which airplane passengers could step, jump or dive and be routed to such land points as they desired. The main objection is that it is hard on the knee pans and elbow joints.

That the large theatres and hotels could train ushers or waiters to properly hold life-saving nets for aerial patrons who give the proper signals has also been suggested, but no net has been devised which will throw a man back to an airplane. So there you are with your engine stalled again.

It's one of those arguments in which you beat around the bush and meet yourself coming back. Entries for suggestions or plans and specifications are still open, however. The only stipulation is that every inventor try out his own stuff.

The line forms on the right!

Letter from Privut "Pete"

My dere Mister Editer:

Came pretty near not gittin' here at all this week. Had an accident. That is, the other fellow had the accident and he detained me. Was on a cross country flight with a Looie named Newton. And incidentally Newt's some bird. He says so his self. But about the accident.

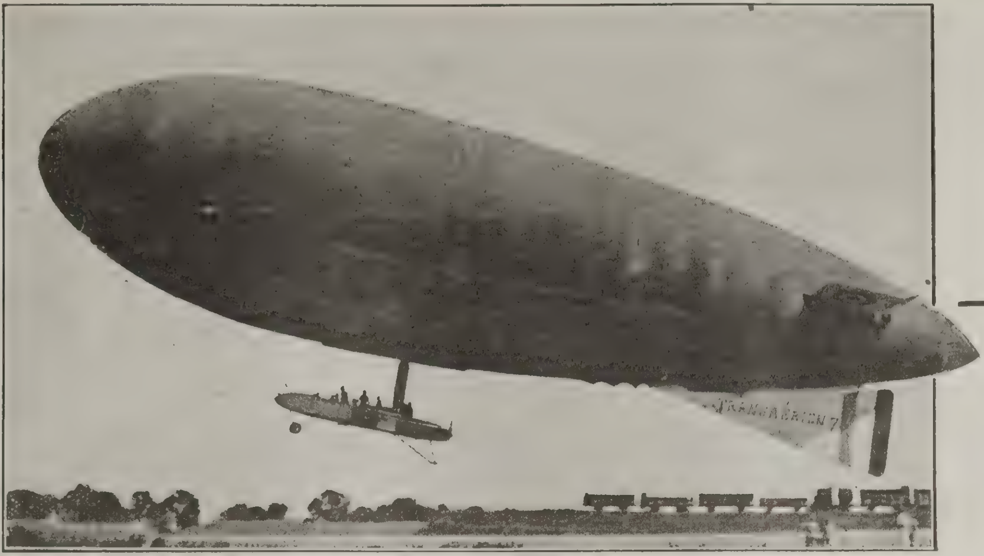
We were cavorting over and about San Jacinto fer the benefit of the natives when all of a sudden we burst an oil line. Forced landing. And Newt stuck her nose down right toward a city street what I found out afterwards was named Broadway, but I guess they was kidding us fer it wasn't no broad way at all.

Well we landed. Nothing else we could do. And jist as we were about to pull up at the curb the left wing skid struck an old man and threw him to the ground. "You know you must be very careless in your walking," said Newt to the old man. "I'm a good pilot. I have been flying for two years."

And the old gent got up out of the dust and said: "Wall, bud, ye got nothin' on me. I've been walking now nigh on to 70 years," and he hobbled off toward the city cafe. Hurriedly,

"PETE."

MOST ANNOYING
After two years' active service with a fighting squadron in France, to be "wiped out" by a mail bag dropped from above by a careless pilot *Courtesy "Flight."*



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$20,000 F.O.B. New York

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All of these balloons are made of special Rubberized Fabric insuring Greatest Efficiency and Safety In the Use of Hydrogen Gas.

Correspondence invited with Aero Clubs, collegiate bodies, concerns planning passenger carrying, aerial transportation and advertising business.

Pilots holding F.A.I. Dirigible and Spherical Balloon pilot certificates desiring to participate in ballooning activities, kindly write stating their qualifications.

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Bureau of Standards Conducting Experiments With Aeroplane Instruments

Recently an investigation at the Bureau of Standards, Washington, D. C., of certain special instruments was made for the military authorities, including rate-of-climb indicators of a German type, a thermograph and balloon manometer of the diaphragm type. In the last named instrument the use of a sensitive diaphragm is carried to a high degree of refinement. A study has been undertaken for developing the necessary new instruments called for, including special altimeters and air speed indicators to give high precision at lower altitudes and lower speeds than those manufactured for aeroplanes. An air volume integrating instrument is also needed to measure the flow of air into the envelope to secure buoyancy and economy in the use of hydrogen.

This investigation is nearing completion and the water channel and vacuum wind tunnel experiments may now be interpreted as showing conclusively (1) that the compressibility of the air may legitimately be left out of account in determining the law of action of the usual Venturi tubes; (2) that the viscosity must not be neglected in low speed flights, thus introducing a new property of the atmosphere hitherto ignored; (3) that at low speeds the indication of the Venturi, contrary to the assumption hitherto made by all users of this type of indicator, is not directly proportional to the air density, nor is it proportional to the square of the speed, but departs noticeably from this relation.

An expert from the Bureau of Standards is working in co-operation with the Air Service Engineering Division at McCook Field, Dayton, Ohio. A number of flight tests have been conducted in connection with the above which have afforded a practical check against the numerical results of the previous laboratory experiments. As soon as these results can be made available, they will be of importance in connection with aeroplane performance tests whenever high precision is required, and more particularly in connection with air speed observations on dirigibles.

Book Reviews

IN THE SIDE SHOWS. *By Capt. Wedgewood Benn.*

This book is the diary of a well-informed, keen observer, who traveled thousands of miles serving on little known fronts.

It is a brilliant account of the extraordinarily varied war experience of Captain Benn who saw active service in the Dardanelles, and served as an aviator along the Arabian and Syrian coasts, with the French fleet in the Near East, and on the Italian front. He was awarded the D. S. O., the Croix de Guerre, the Legion of Honor, the Italian Medal for Valor, and the English Distinguished Flying Cross.

This book can be purchased at the Aeronautic Library, Inc., New York City. Price postpaid $4.40.

Aeronautics in Theory and Experiment. *By W. Cowley and H. Levy, members of the Scientific Staff, National Physical Laboratory.*

This volume provides a complete experimental and theoretical treatment of aeronautics. The more mathematical sections of the subject have been treated in considerable detail, but at the same time the needs of the student of only moderate mathematical ability have been fully borne in mind.

A complete analysis is provided of the properties required in aerofoils, propellers, controls and other parts, in order that the complete machine may be specially suitable for particular functions, such as high speed work, climbing or weight carrying.

It also deals with the steady motion in flight, straight line, circular and spiral; the mathematical theory of stability, and approximate methods are given for estimating the dimensions of the various controls and stabilizing surfaces required for stability. Performance curves of the complete machine treated in relation to all these questions are constructed and analyzed.

The manner in which investigations are conducted on models and full size aeroplanes are entered into, and a sound and lucid explanation of the method of prediction of full scale data from model tests and their underlying principles are treated at some length. The application of this to the aerofoil, propeller, etc., and the parallel interpretation from the point of view of fluid motion are dealt with in their respective chapters.

This book can be purchased at the Aeronautic Library, Inc., 299 Madison Avenue, New York City. Price postpaid $6.00.

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AERIAL AGE

WEEKLY

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Modern Method of Observing Automobile Races—An Aerial Photograph of a Motor Speedway

National Movement to Popularize Aeronautics to be Launched by the Aero Club of America

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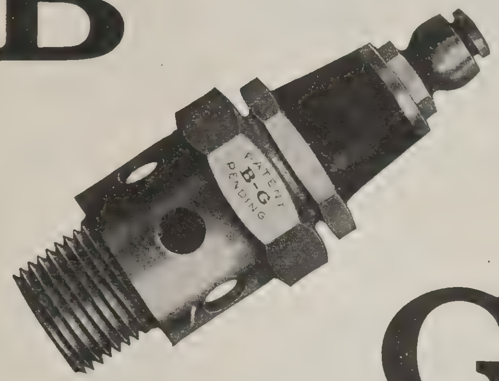

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AERIAL AGE
WEEKLY

VOL. XI APRIL 19, 1920 NO. 6

TABLE OF CONTENTS

PAGE

National Movement to Popularize Aeronautics To Be Launched By the Aero Club of America....... 179

Sixty Aero Clubs to Send Delegates to Atlantic City, May 20 to May 30, to Discuss Plans to Popularize Aeronautics 180

The News of the Week............ 181

The Aircraft Trade Review....... 183

U. S. Aerial Mail................ 184

Fiat Twelve-Passenger Aeroplane.. 185

Determination of the Pressure Law for Wing Surfaces............ 188

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures............ 192

Naval and Military Aeronautics... 193

Foreign News.................... 194

Elementary Aeronautics and Model Notes 195

Aeronitis 196

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167

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NATIONAL MOVEMENT TO POPULARIZE AERONAUTICS TO BE LAUNCHED BY THE AERO CLUB OF AMERICA

One Hundred Thousand Membership Aimed At—Twenty Important International and National Contests and Events—$25,000 In Prizes Offered for Pan-American Aerial Derby

FINDING that the secrecy maintained regarding the actions of the Board of Governors of the Aero Club of America at its last meeting has resulted in the circulation of a number of incorrect rumors, the Executive Committee has issued a report of the meeting giving an exact account of what transpired at the meeting.

By so doing, the Executive Committee is forced to make known the fact that at this meeting it was proposed to launch a huge movement to popularize civilian aeronautics with a campaign for membership for the Aero Club of America, so extensive as to give the Club a membership of one hundred thousand and conduct such extensive aerial activities that America shall obtain and maintain its leadership in aeronautics hereafter.

Following are the exact transcripts of the Minutes of the meeting:

"The meeting was called to order by Colonel Jefferson De Mont Thompson, the President of the Club. There were present the following members of the Board of Governors; Lieut. Col. James A. Blair, Jr., U. S. A.; W. Redmond Cross, Charles Jerome Edwards, Alan R. Hawley, Lt. Col. F. L. V. Hoppin, W. W. Miller, Major G. A. Pollock, Professor Charles L. Poor, Colonel Jefferson De Mont Thompson, Rear-Admiral Bradley A. Fiske, U. S. N.; Henry A. Wise Wood, Henry Woodhouse and Augustus Post.

3,000 Members, 2,000 Pilots

"(1) The first item in order of business was the election of new members, which brought the report of the Membership Committee, of which Colonel Hoppin is Chairman, to the effect that the total membership of the Club was reaching the 3,000 mark, of which 2,000 are Army and Navy members, mostly Army and Navy pilots.

8,000 Pilot Certificates Granted

"(2) The Contest Committee presented 20 applications for Aviation, Balloon, and Dirigible Pilots' Licenses, which were granted, and Mr. Alan R. Hawley, the Chairman of the Contest Committee, reported that a total of close to 8,000 Pilots' Certificates had been granted by the Club up to date.

Gordon Bennett Balloon Race to Be Held at Indianapolis

"(3) Mr. Augustus Post, the Secretary, presented a report to the effect that arrangements had been made to hold the International Balloon Race at Indianapolis, Indiana, and that the Aero Club of America had been challenged for this Trophy by England, France, Italy, Belgium and Switzerland, all of which are sending teams to the United States to compete for the Trophy, which is now held by the Aero Club of America. The Secretary reported that notice had been sent to the 800 balloon pilots asking whether they were in a position to represent the United States in the defending teams, and that the applications were so numerous that it would be necessary to consider the advisability of holding elimination races to select the best teams.

$25,000 Prizes for Pan-American Aerial Derby

"(4) The Secretary also presented a letter from Carl G. Fisher of Miami, Florida, stating that he and other Miami interests would offer $25,000 in prizes if the Aero Club of America decides to make Miami the starting point for the Aerial Derby Around South America, which the Aero Club of America and the Aerial League of America are planning with the co-operation of the national Aero Clubs of the 20 countries affiliated in the International Aeronautic Federation, of which the Aero Club of America is the sole representative in the United States.

Aerial Derby Around the World Commission Meets Great Success

"(5) Cables received by the Aero Club of America from the Special Commission which is going around the world, organizing the First Aerial Derby Around the World, were presented, reporting that the Commission had been received enthusiastically throughout Japan, China, the Philippines, the East Indies, Siam, Sumatra, and in Calcutta and other cities in India, and that they were continuing on with their mission which has been most successful.

"(6) As the attention of the Board was being called to the 20 international and national contests which are being organized in the United States and throughout the world under the rules of the International Aeronautic Federation, and to the matter of securing the widest of American participation in these contests, a member of the Board of Governors requested the privilege of bringing up another matter which he considered of greater importance.

Government Officials Urge Club to Start Movement to Popularize Aeronautics

"(7) Having been granted the privilege of bringing up new business, this member of the Board of Governors, who had just returned from Washington, where he had conferred with Government authorities, stated that in view of the fact that the Allies have cut their aeronautic programs down to a minimum, and also for other reasons, there is little liklihood that Congress will give large appropriations for Army and Navy aeronautics, America's leadership in aeronautics depends on starting a great movement to create national civilian interest in aeronautics.

"The Government authorities, this member stated, are looking to the Aero Club of America to start and conduct such a movement, just as it started and conducted the movement for the building of our Air Forces from 1915 to the signing of the Armistice. If the Aero Club of America starts such a movement, the Club will not only render a great service to the country, but will secure a large membership which, it is believed, will reach beyond the hundred thousand mark.

To Insure America's Leadership in Aeronautics

"It is generally acknowledged that the Aero Club of America in developing civilian aeronautics in the past two years saved the Aeronautic Movement, as it created an extensive demand for aircraft for civilian purposes.

"This movement can be conducted further and can be made a popular national movement, which will insure America's leadership in aeronautics hereafter.

Sixty Aero Clubs to Be Invited to Cooperate

"(8) The plan was unanimously approved, and in the discussion of Ways and Means to carry the plan into effect, it was suggested that the co-operation of the 60 or more Aero Clubs and co-operating organizations in the United States should be invited in this movement, and a Commission duly appointed to consider Ways and Means. A motion was duly made and seconded and unanimously carried that the President of the Club be instructed to appoint a Committee of five (5) to consider Ways and Means of bringing about close co-operation between all aeronautic organizations in the United States, the Committee to report to the Board of Governors within five weeks with recommendations as to the ways and means to be adopted to bring about the co-operation of all organizations in carrying out this great program to nationalize and popularize the Aeronautic Movement."

Every resolution was adopted unanimously and it was a most cordial and constructive meeting and the future may show that it was an epoch-making meeting. Similar meetings in past years led to those extensive activities which popularized aeronautics and resulted in forming the aerial reserves and securing large appropriations from Congress for the Air Service.

SIXTY AERO CLUBS TO SEND DELEGATES TO ATLANTIC CITY MAY 20th TO MAY 30th TO DISCUSS PLANS TO POPULARIZE AERONAUTICS

THE Aero Club of America has invited sixty aero clubs to send delegates to the Aeronautic Congress to be held at Atlantic City May 20th to May 30th to discuss the plans for popularizing aeronautics.

The Aero Club of America has been officially advised that President Wilson will open the Third Pan-American Congress by radio from the White House.

The Navy Department will participate in the Congress and Exposition.

The Congress will open at the Steel Pier, Atlantic City, May 20th to May 30th. A receiving apparatus will be set up on the pier and at three o'clock in the afternoon, the hour set for the official opening of the Congress, President Wilson's radio message, formally opening the Congress, will be received.

It is expected that the official representatives of thirty-two countries and delegates from sixty aero clubs and five thousand civic bodies, automobile and yacht clubs, chambers of commerce and other scientific, educational and commercial organizations will be present and the Congress will be the greatest aeronautic event ever organized.

Governments, Aero Clubs, Sporting, Scientific, Industrial and Civic Organizations Invited

The program is most thorough and complete. Tens of thousands of people of different lines of human endeavor related to aeronautics are invited to attend the Congress. For instance, on the day when the "Large Dirigible and Its Value for Transportation" is discussed, the representatives of railroads, express, steamship and other transportation organizations are invited to attend.

For the illustrated address on "Aerial Forest Patrol" the Forestry Department of every State are invited. For the discussion of the "Work of Aerial Police Squadrons and Why Every City Should Have One" the Police Commissioners of all cities are invited.

For the illustrated address on and consideration of "Aerial Mail Plans" the Chairman of Post Office and Post Road Committee of House of Representatives and Senate and Postmaster General Burleson and 26,000 United States postmasters, and Chambers of Commerce and 13,000 cities are invited to attend.

Likewise for the illustrated address on the "Need of Municipal Aerodromes and the Part to Be Played by Aircraft in City Planning" the Chambers of Commerce and City Planning Commissions of 13,000 cities are invited to attend. Those present will be given carefully prepared plans telling how to establish aerodromes and make them self-supporting.

For the discussion of "Pan-American Aerial Transport" the commissions of the twenty Latin-American Republics are invited to attend.

For the discussion of "Aerial Navigation Instruments for Flying Over Land and Water" aviators, navigators, scientific instrument makers and aeronautic experts are invited to attend.

For the addresses on "Aerial Photography" all the photographers, professional and amateur, and makers of photographic apparatus are invited to attend.

For the addresses on "Aerial Exploration and the Use of Aircraft for Coast and Geodetic Survey" all people interested in exploration and surveying are invited to attend.

For the addresses on "Need of Broader Attitude Regarding Insurance for Aircraft and Aviators" all the insurance companies and agents are invited to attend.

For the discussion of intercollegiate aeronautics 600 universities and colleges are invited to send delegates.

For the addresses on "Aerial Jurisprudence—Aerial Laws and Regulations of Air Traffic" all lawyers, traffic commissioners and police authorities of different countries are invited to attend.

The engineers are invited to attend the aeronautic engineering meeting when basic problems of aeronautic engineering are to be discussed.

One of the subjects to be discussed will be "The Newspapers' Great Contribution to the Development of Aeronautics," at which data will be presented showing the great influence on the development of aeronautics which the several hundred prizes offered by newspapers the world over during the past twenty years have had in popularizing aeronautics. Also statistics showing the extensive increase in circulation which came from the offer of aeronautic prizes.

Alberto Santos-Dumont, the pioneer Brazilian inventor and aeronaut who spent over half a million dollars in developing the sport of aeronautics since 1901, when he first piloted a self-invented dirigible around the Eiffel Tower in Paris, is the chairman of the committee in charge of the Congress.

The Congress is held under the auspices of the Aero Club of America, the Pan-American Aeronautic Federation, the Aerial League of America, the Liga Aerea de Cuba, the Aerial Touring Association and the Aero Club of Atlantic City.

Mr. Santos-Dumont, who is vice-president of the Aero Club of America and president of the Pan-American Aeronautic Federation, states that "aerial transportation and aerial sports will knit the states of the Western Hemisphere into an integrally united, co-operating and friendly combination, allied for well-being in sport, trade and commerce, as well as for strength in time of possible war."

As chairman of the Pan-American Aeronautic Committee he has been traveling through South and Central America, creating interest in aeronautics.

Commodore Louis D. Beaumont, member, Board of Governors, Aero Club of America, the chairman of the commission organizing the First Aerial Derby Around the World, and Major Charles J. Glidden, the originator of the Glidden Tours and president of the Aerial Touring Association, who started for the trip around the world last October, have personally extended invitations to the authorities, aero clubs and other organizations of all the countries visited.

This Congress will open a new epoch in aerial sport which has been dormant since the beginning of the war. As there are 18 international and national contest being organized, with prizes amounting to over $2,000,000, open to American pilots holding the international pilot certificates, and the Aero Club of America alone has issued 8,000 of these pilot certificates, and Great Britain and France and Italy have issued over 10,000 pilot certificates each, the stupendous aerial contests being organized are assured of success. The regulations for the Pan-American Aerial Derby, the Aerial Derby Around the World and the Aerial Circuit of the Atlantic are to be discussed during the Congress at Atlantic City.

Aero Show to Have New Types

The Aero Show to be held on the Steel Pier will have numerous surprises, including new types never exhibited before.

Fourteen thousand square feet of space for aircraft and booth for accessories have already been reserved. Applications for space should be addressed to Alberto Santos-Dumont, Chairman, Aerial League of America, 280 Madison Avenue.

THE NEWS OF THE WEEK

New Airship Hangars Ready Soon

When the United States Navy contracted last summer for a dirigible larger than the R-34, plans were immediately started for a hangar to house it.

The new Navy hangar at Lakehurst will accommodate two dirigibles both more than twice as large as the R-34. It will be larger than any hangar in the world, either in construction or plan.

Plans and specifications were prepared and contracts awarded last fall. The building as originally projected was to be 800 feet long. Changes since then have been suggested to increase the length of nearly 1,000 feet. It will have a width of 318 feet and a height of 200 feet.

The double doors at one end, consisting of two leaves, are 177 feet high and 136 feet wide. They have a frame of structural steel, braced to a width of 76 feet at the bottom. Special railway tracking is provided as a slide for these tremendous portals.

When opened, the doors and the arch of the roof form a windbreak nearly 600 feet wide, insuring safety in landing and releasing the ships.

Overhead trolleys are provided for the construction of airships. Three docking rails of special design for landing, releasing and mooring purposes extend the length of the building and for 1,500 feet in front.

It is expected that the hangar will be completed during the coming summer.

U. S. Balloon Sets Record

Wilmington, N. C.—After setting what is believed to be a world record by flying 900 miles in fourteen hours and fifty-five minutes, a naval balloon attached to the training station at Pensacola, Fla., made a forced landing in a field near Kerr, thirty miles from Wilmington.

The four occupants of the balloon, Lieut. Kenney, U. S. N., commanding, and Lieuts. Kelly and Keyo, of the Marine Corps, and Gunner Bundy, U. S. N., students at the Pensacola stations, were shaken up.

Plan Los Angeles-San Diego Aerial Service

George D. White, the Los Angeles aeroplane manufacturer, has announced that he will establish an aerial service between Los Angeles, and San Diego, using 7-passenger twin-motored aeroplanes to be built in the Los Angeles White Aeroplane factory.

The distance betwen the two cities is about 150 miles and requires 6 hours by motor car or auto stage. This time will be cut to 1½ hours by the White aerial line.

The maximum price for the one way trip will be $35. Already great enthusiasm has been shown among the business men of Los Angeles who have signified their intention of patronizing the air line whenever their business calls them to San Diego.

The White aerial line follows the coast and includes among the cities on its route, Wilmington, Long Beach, Laguna, Oceanside, La Jolla and Pacific Beach. Later lines will be established throughout the state.

Senate Committee Increases Aviation Allowance

The Senate committee has granted liberal increases of nearly $10,000,000 for naval aviation.

The largest single increase was $11,700,000 for completing aviation tenders under construction at Hog Island. The House omitted this item.

In providing additional funds for naval aviation the Senate committee increased the House item for naval aircraft from $3,464,000 to $6,500,000, and that for new aviation stations from $1,257,000 to $5,400,000. Funds for experiments and developing all types of aircraft were increased from $2,935,000 to $3,700,000.

Plane Lands on Warship

London.—The first aeroplane to rise from and alight again on the deck of a warship was one of those aboard the Furious, a mother ship for aeroplanes, while the British fleet was off Vigo recently.

Aeroplanes were used to ascend from the Furious during the war, but were unable to make landings on the vessel again. This time it was successfully accomplished.

Ace Plane Exhibited in New York

A latest type "Ace" single seater sport plane, manufactured by Horace Keane, Inc., of New York, is attracting unusual interest at the show-room of Club Motors, Inc., 240 West 59th Street, New York City.

Many automobile men have inspected the little machine whose wings may be folded so that one needs a space only ten feet wide to "taxi" down the street. The "Ace" weighs only 600 pounds and has a wing spread of 25 feet. With a landing speed of 30 miles an hour a run of only 60 feet is required to bring it to a full stop.

Rolfe-Epps Flying Field at Athens, Ga.

The Rolfe-Epps Flying Field, located about three miles almost due east of Athens, Georgia, has proven very popular and useful to aviators, as seven transient aeroplanes have stopped there for gas and to make minor adjustments.

As it is the only field in that vicinity it will be valuable for pilots to know its location. A hangar is in the northwest corner of the field, and a wind zone over the hangar. There are two smooth runways at right angles to each other. They are 1,600 feet long and 50 feet wide. Gas can be obtained at the field, and also spare parts for planes and OX-5 motors.

Country Club to Feature Aviation

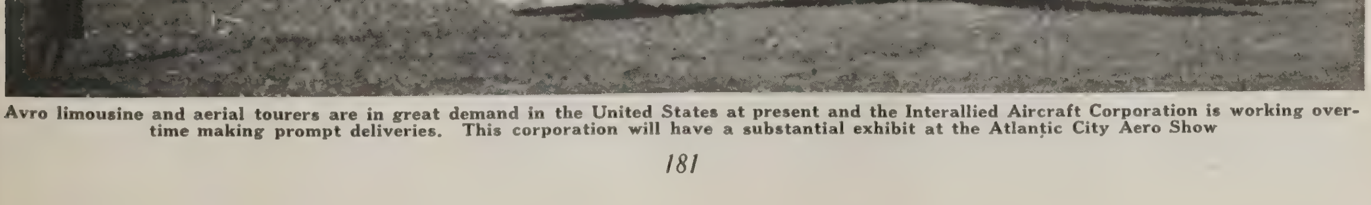
Detroit.—Temporary directors of the Aviation Country Club, the organization which took over the Flanders estate of 823 acres surrounding Green Lake, has made the initial payment on the tract, and permanent organization will be perfected immediately. The temporary directors are: H. M. Leland, of the Lincoln Motor Co.; C. B. Bohn, of the Bohn Foundry Co.; Colonel Sidney Waldon; C. W. Dickerson, of the Timken-Detroit Axle Co., and a number of other leading men in the automotive industry.

One of the chief features of the country club will be aviation, the grounds of the big estate furnishing an ideal flying field.

Decennial Celebration for Forest Products Laboratory

Madison, Wis.—Preliminary arrangements are under way for a big meeting at Madison during the latter part of June to celebrate the tenth anniversary of the opening of the Forest Products Laboratory. It is expected that a large gathering of representatives from the various industries interested in the laboratory's work will be present. Present plans call for a two-day meeting with addresses by men of national reputation in science and industry, a banquet, tours of inspection through the laboratory, informal discussions and various forms of entertainment.

The Forest Products Laboratory is a



Avro limousine and aerial tourers are in great demand in the United States at present and the Interallied Aircraft Corporation is working overtime making prompt deliveries. This corporation will have a substantial exhibit at the Atlantic City Aero Show

branch of the United States Forest Service, established in 1910 in co-operation with the University of Wisconsin, and is a consolidation of a number of testing laboratories and other units of the Forest Service which had been located at various points throughout the United States. It is engaged principally in industrial research on problems connected with the manufacture and use of forest products, including, besides lumber, posts, poles, ties, and similar products, pulp and paper, naval stores, hardwood and softwood distillation products and other chemicals and pharmaceuticals. At the present time the laboratory employs about 200 people and occupies five buildings in whole or in part.

The laboratory has been of great assistance in connection with the aviation industry, conducting tests and experiments with woods for the construction of aeroplanes.

Aircraft Insurance Grows

New York.—A steadily increasing demand for various forms of aircraft insurance is reported by offices writing this class of risk. The inquiry comes from all parts of the country and usually is for good-sized lines. Rates vary somewhat and appear high when compared with other forms of risks. The fire hazard rate for dirigibles runs from 20 to 30 per cent for a six months' policy. Aeroplanes are being insured against fire and theft at rates averaging about 4 per cent for six months. The collision hazard ranges from 7 to 9 per cent and that for property damage is being assumed for 5 per cent.

Flying Instructions on a Country Estate

The Philadelphia Aero-Service Corporation are to operate a branch of their flying school at Greystone, the country estate of P. M. Sharples, near West Chester, Pa., this summer.

Mr. Sharples is greatly interested in the development of Commercial Aviation and is desirous to have some employees of his separator plant and some members of his family taught to fly. He has erected a commodious hangar on his property and arranged with the Philadelphia Aero-Service Corporation to furnish training machines and instructors from their aerodrome and training school, which is about twenty miles from his property.

Greystone is one of the finest country estates in Pennsylvania. It is over two thousand acres in extent and the natural features of hill and gully have been preserved and embellished with great skill in the landscape development. So far is this true that it required an aerial survey of the property to choose the proper landing and training fields. Even so short time as five years ago landed gentlemen did not consider aeroplane requirements in their plans which are today a necessity.

Dr. J. A. Brashear, Astronomer and Scientist, Dead

Pittsburgh.—Dr. John A. Brashear, former chancellor of the University of Pittsburgh and one of the most eminent of American astronomers, died at his home here recently.

Dr. Brashear became famous for the invention and manufacture of scientific instruments, largely for the Government. He was a close friend of the late Dr. E. G. Langley, former head of the Smithsonian Institution, and was interested with him in his early experiments in the construction of flying machines. He was a member of many scientific societies in this country and Europe.

© C. E. Howard

Howard M. Rinehart, Assistant Engineer of the Dayton-Wright Corporation who will probably pilot the Dayton-Wright entry in the Gordon Bennett Cup Race

Horse Travels in Aeroplane

Santa Barbara, Cal.—A horse entered in an exposition here arrived recently by aeroplane from Los Angeles. The trip was delayed a day until officers of the Humane Society had been convinced no cruelty was involved in the trip, which was made in an especially equipped aeroplane.

To Start Aerial Express Service On Great Lakes

Detroit.—The United States Aerial Express will start commercial service between Detroit and Cleveland May 1. Two Curtiss seaplanes will be put on regular schedule, and the company plans a similar service between Detroit and Toronto, and Detroit and Buffalo with two planes each, the latter to start June 1, and the Toronto line about June 15.

© C. E. Howard

Milton Bauman, Engineer of the Dayton-Wright Corporation in charge of construction of their Gordon Bennett entry

The company is headed by Thomas F. Dunn, a former army aviation officer, and Jean Servantie, of the French Flying Corps.

In addition to the two plane units operating between Detroit and the three lake cities there will be one through line, which will touch at all four cities, and which is designed primarily to care for overloads, or to pick up traffic in the event of interruption to one of the direct units operating between two cities.

In addition to the planes operated in the commercial field there will be ten planes distributed at Cleveland, Detroit, Buffalo, Put-in-Bay, Port Huron, Toronto and Toledo for novelty purposes by the company.

The company expects to get the mail contract between Detroit and Cleveland, and the planes will be equipped to carry mail and passenger baggage, making the trip to Cleveland in about 75 minutes. The planes will start and stop in the river and lake, and passengers will be taken out in a dinghy.

In addition to the passenger service a night express service will be maintained for carrying registered mail, clearing house receipts and other important matter. The express planes will be capable of carrying 5,000 pounds. The planes, which are so equipped that they can make from 50 to 60 miles an hour on the water, are 105 ft. spread.

Business men are enthusiastic over the proposition from its commercial advantage. The schedule calls for one round trip each day in either direction, but it is possible to make eight if patronage demands.

The company will operate throughout the year, the planes being equipped to land or travel on ice, as well as water.

Personal Pars

Leigh M. Griffith, senior staff engineer of the National Advisory Committee for Aeronautics, has transferred his office from Washington to the research laboratory of the committee at Langley Field, Hampton, Va.

John H. McNamara has been elected vice-president of the Keuka Industries, Inc., Hammondsport, N. Y. He was formerly production manager of the Buffalo plant of the Curtiss Aeroplane & Motor Corp.

George B. Fuller has accepted a position in the truck department of the Packard Motor Car Co., Detroit, Mich. He was formerly assistant chief engineer of the Glenn L. Martin Co., Cleveland, O.

W. K. Swigert has been appointed general factory manager Oakes Co., Indianapolis, Ind., manufacturers of automotive cooling fans and special metal stampings. Swigert is a production man with 25 years' experience in the automobile industry in the middle west. In 1912 he became general superintendent of the Chalmers factory in Detroit, resigning after six years to become superintendent of production on the Liberty aeroplane motor in the mammoth Nordyke & Marmon plant at Indianapolis. Early in 1919, after all work on the Liberty motors had been completed, Swigert joined the Dort Motor Car Co., Flint, Mich.

The AIRCRAFT TRADE REVIEW

N. E. J.

Experience With Fokker Show Non-Inflammable Fabric Used

During a series of experiments with the Fokker, the Engineering Department of the First Pursuit Group at Kelly Field, Texas, found to its surprise that the plane was covered with non-inflammable fabric. The material used in this test was a piece of covering from the standard D-VII Fokker wing which, when exposed to the flame of a blow-torch, showed that fireproofing had been accomplished to such an extent that even though the torch was held at one spot a considerable time must elapse before a hole appeared and there was no spreading of the flames to larger areas than that covered by the blow torch.

The early German planes on the front went down in flames often enough to justify the opinion that only the very late ones possessed this covering.

The Fairchild 4 x 5 Hand Held Aerial Camera

This camera is designed primarily for taking oblique pictures. It can, however, be used equally well for vertical exposures.

The entire camera and plate magazine is made of metal and is built to stand rough handling common to cameras used in the air.

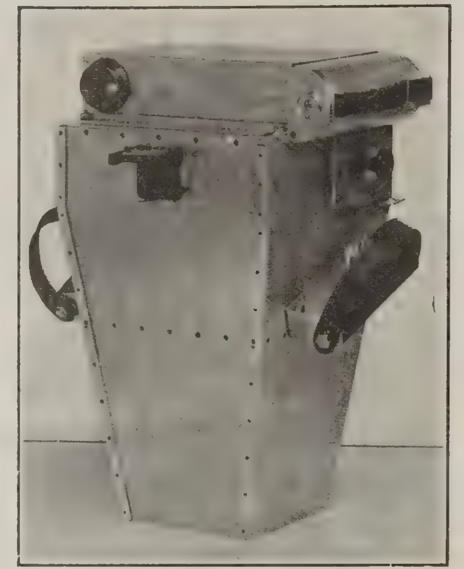
The camera is fitted with two side grips set at the proper angle to afford comfort and balance in holding. The position of the shutter release is such that the thumb of the right hand rests naturally upon it. The release itself is very light so that there is no danger of moving the camera in releasing the shutter.

The plates are automatically changed and the shutter set by the one operation of pulling the magazine in and out. This interconnection of the magazine with the shutter is of great value as it obviates any possibility of double exposure, and permits successive pictures to be taken with the greatest rapidity. A counter is provided with large figures which can be read either from the back or side of the magazine. On the twelfth exposure, the magazine locks so that it is impossible to re-expose the first plate. The magazine is operated by a leather handle which is of such dimensions as to be easily handled with heavy gloves. A rack is provided on the back of the magazine for holding the safety slide when not in use. The magazine has a capacity of twelve plates.

The shutter is of the variable slit, fixed tension, focal-plane type. Exposures range from 1/50 to 1/500 of a second. The exposure is varied by merely turning the setting knob to the desired exposure. Two safety doors automatically close while the shutter is being rewound.

The camera is fitted with an 8½ inch f.4.5. lens as standard equipment although Cooke Aviar, Bausch and Lomb Tessar, Berthiot or Carl Zeiss lens may be used.

Two color fillers, permanently attached to the camera, are so arranged that either one may be swung in front of the lens or the lens used without fillers as desired. A special film magazine can be furnished to use interchangeably with the plate magazine.



Fairchild Hand Held Aerial Camera

Tavener in Consulting Engineering

Charles H. Tavener, aeronautical mechanical engineer, has resigned from the Garden City Plant of the Curtiss Aeroplane and Motor Corporation to go into consulting engineering. He will specialize in design, supervision, and production methods with a view to reducing production costs. Laboratory facilities have been procured for development work and testing in Boston and New York.

Mr. Tavener has been interested in the aeronautical field for the past ten years and has made a study of all phases of this branch of engineering. During the war he was connected with the Curtiss Engineering Corporation as a mathematical designer where he worked on the well known "Hornet" 'Wasp" "H. A." Mail and Curtiss "Sea Gulls". Later he became assistant project engineer on the M.F. Flying Boat and while in the production department did much work on simplification of existing production methods and system. Following this he became Assistant Plant Engineer in charge of power plant tests, construction and repair, and interplant changes and finally did considerable work on cost accounting as applied to aeronautical production.

Previous to going with the Curtiss Company Mr. Tavener worked at the Wind Tunnel of the Massachusetts Institute of Technology, Cambridge, Mass. While in college he organized and was president of the Aero Club of M. I. T., assisted on the staff of the aeronautical department of the *Technology Monthly*. and served on the Committee for Aeronautical Preparedness.

C. D. Hanscom With Glenn L. Martin Company

Mr. C. D. Hanscom, Harvard graduate and recently Instructor of Aeronautics at the Massachusetts Institute of Technology, is now Chief Engineer of the Glenn L. Martin Company, succeeding D. W. Douglas, who has resigned.

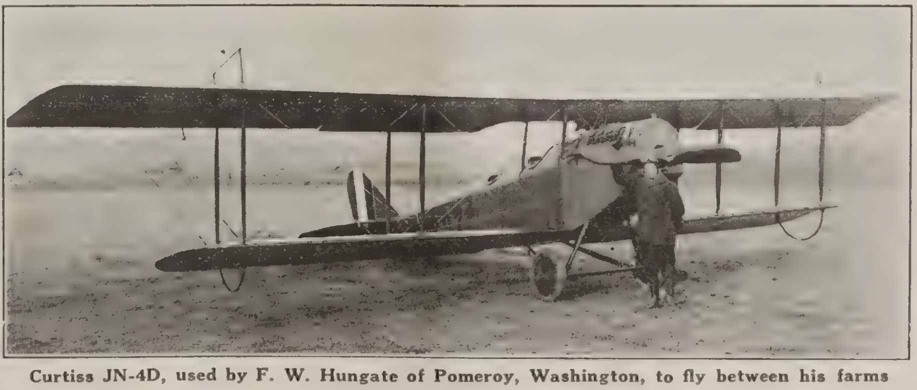
Farm Commuting By Aeroplane

By the use of an aeroplane between his two farms, separated by a long, deep canyon, unbridged, Fred W. Hungate, banker and farmer, of Pomeroy, Washington, saves nine and one-half hours from the time required to make the trip by automobile. The trip from his farms to Spokane, which he makes frequently, takes nine hours by train and six by automobile. By aeroplane he covers the same distance in one hour and twenty minutes.

Realizing what a tremendous saving in time would be afforded to him by utilizing the aeroplane instead of the train or automobile, Mr. Hungate took a complete course in flying at the Symons-Russell Flying School at Spokane. Completing his training he purchased a Curtiss JN-4D from the Symons-Russell Aviation Company, Curtiss distributers for the Inland Empire.

Mr. Hungate's training was taken in midwinter. Hs first flight alone was made with six inches of snow on the ground. He has erected a one-plane hangar on his farms and prepared landing fields.

Hundreds of flights over Spokane were made by the Symons-Russell company throughout the winter. Students of the school are given a thorough course in ground work, including care and adjustment of the motor, rigging and minor repairing.



Curtiss JN-4D, used by F. W. Hungate of Pomeroy, Washington, to fly between his farms

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, Assistant to the Second Assistant Postmaster General in Charge of Aeronautics
S. Murray Moore, Jr., Chief of Maintenance and Equipment

J. Clark Edgerton, Chief of Flying
John A. Jordan, Chief of Construction
George L. Conner, Chief Clerk, Aerial Mail Service
John A. Willoughby, Operator in Charge Radio Experiments
Eugene Sibley, Operator in Charge Radio Maintenance and Operation

Eugene J. Scanlon, Chief of Supplies

US AERIAL MAIL

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Paul S. Oakes
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt

Charles I. Stanton, Superintendent New York-Washington Division
Walter H. Riddell, Superintendent, New York-Chicago Division
William J. McCandless, Superintendent, Chicago-Omaha Division
Samuel F. Doane, Manager, Heller Field, Newark, N. J.
William H. Read, Manager, Bustleton, Pa.
Duard B. Colyer, Manager, College Park, Md.
Andrew R. Dunphy, Manager, Chicago, Ill.
Maurice J. Kelly, Manager, Bellefonte, Pa.
William I. Votaw, Manager, Omaha, Nebraska
Victor W. Fitch, Manager, Newark Warehouse

PILOTS

Frederick A. Robinson
Walter J. Smith
Paul W. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris
Mark C. Hogue
Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen

UNITED STATES POST OFFICE DEPARTMENT

AIR MAIL SERVICE—NEW YORK-CHICAGO ROUTE

Monthly Report of Operation and Maintenance

JANUARY, 1920

Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	SERVICE AND UNIT COST						
													Gallon of Gasoline	Total Time Run		Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
														hr.	min.				
39A	$25.20	....	$83.60	$46.08	$26.93	$161.00	$36.52	$91.21	$13.50	$75.00	$86.05	$645.09	90	3	38	350	3.9	$177.54	$1.84
49	80.64	$5.05	83.60	46.08	26.93	161.00	81.07	87.83	24.00	50.88	86.05	733.13	288	8	04	600	2.1	214.80	1.22
60	62.70	7.18	83.60	46.08	26.93	161.00	18.43	220.78	3,506.15*	50.00	86.06	4,268.91	215	1	50	140	0.7	2,328.48	30.49
65	3.36	....	83.60	46.08	26.93	161.00	....	46.65	....	50.00	86.06	503.68	12	....		......	......	....	......
66	130.86	58.68	83.60	46.08	26.93	161.00	129.98	111.46	290.00	50.00	86.06	1,174.65	473	12	56	1,370	2.9	90.78	.86
67	....	....	83.60	46.08	26.93	161.00	....	46.52	2,650.00*	50.00	86.06	3,150.19	......	....		......	......	....	......
72	68.38	17.64	83.60	46.08	26.93	161.00	46.90	110.12	415.00	50.00	86.06	1,111.71	248	4	40	415	1.7	238.20	2.68
75	226.80	87.33	83.60	46.08	26.93	161.00	371.01	248.19	470.00	50.00	86.06	1,857.00	825	36	55	3,308	4.0	50.28	.56
76	....	....	83.60	46.08	26.93	161.00	....	45.59	....	50.00	86.06	499.26	......	....		......	......	....	......
79	39.96	31.68	83.60	46.08	26.93	161.00	72.03	95.13	....	50.00	86.06	692.47	148	7	10	650	4.4	96.60	1.07
85	....	....	83.60	46.08	26.93	161.00	....	59.75	....	50.00	86.06	513.42	......	....		......	......	....	......
88	....	....	83.60	46.08	26.93	161.01	....	325.73	105.00	50.00	86.06	884.41	......	....		......	......	....	......
92	212.53	39.14	83.60	46.08	26.93	161.01	238.86	284.18	8.50	50.00	86.06	1,236.89	778	23	46	2,222	2.9	52.02	.57
94	191.37	26.62	83.60	46.09	26.94	161.01	171.69	206.53	95.50	50.00	86.06	1,145.41	685	17	05	1,950	2.8	67.02	.59
98	....	....	83.60	46.09	26.94	161.01	....	24.39	....	50.00	86.06	478.09	......	....		......	......	....	......
101	5.70	....	83.60	46.09	26.94	161.01	....	178.20	....	50.00	86.06	637.60	20	....		......	......	....	......
102	357.01	96.11	83.60	46.09	26.94	161.01	469.50	458.56	310.10	50.00	86.06	2,144.98	1,319	46	43	4,265	3.2	45.90	.50
104	435.83	133.04	83.60	46.09	26.94	161.01	727.79	419.78	305.43	45.50	78.06	2,463.07	1,601	72	25	6,519	4.1	33.96	.38
105	27.00	14.04	83.60	46.09	26.94	161.01	60.30	38.54	....	28.00	48.13	533.65	100	6	00	555	5.6	88.94	.96
106	212.27	74.34	83.60	46.09	26.94	161.01	330.81	186.03	8.00	50.00	86.06	1,265.15	763	32	55	3,160	4.1	38.40	.40
107	269.14	84.75	83.61	46.09	26.94	161.01	298.82	300.05	91.75	45.50	79.89	1,487.55	970	29	44	2,781	2.9	49.98	.53
108	164.93	17.90	83.61	46.09	26.94	161.01	143.55	184.38	71.05	50.00	86.06	1,035.52	548	14	17	1,421	2.6	72.48	.73
111	89.60	14.50	83.61	46.09	26.94	161.01	17.76	138.40	100.05	100.00	86.06	864.02	320	1	46	137	0.4	489.06	6.31
201	....	....	83.61	46.09	26.94	161.01	....	348.63	146.00	200.00	86.06	1,098.34	......	....		......	......	....	......
202	99.40	24.00	83.61	46.09	26.94	161.01	5.86	421.90	199.95	200.00	86.06	1,354.82	355	..	35	40	0.1	....	33.87
203	184.24	23.00	83.61	46.09	26.94	161.01	121.94	379.93	161.70	200.00	86.06	1,474.52	658	12	08	1,104	1.7	121.50	1.34
204	140.00	135.03	83.61	46.09	26.94	161.01	85.43	188.10	155.95	200.00	86.06	1,308.22	500	8	30	390	0.8	153.90	3.35
205	135.54	20.03	83.61	46.09	26.94	161.01	82.98	149.17	20.95	200.00	86.06	1,012.38	502	8	10	504	1.0	123.96	2.01
206	58.80	3.15	83.61	46.09	26.94	161.01	40.79	133.72	35.95	200.00	86.06	876.12	205	4	03	360	1.8	216.30	2.43
24227	....	....	83.61	46.09	26.94	161.01	....	70.75	40.50	50.00	86.06	564.96	......	....		......	......	....	......
Total	$3,22126	$913.21	$2,508.10	$1,382.57	$808.07	$4,830.19†	$3,552.02	$5,600.20	$9,225.03	$2,444.88	$2,529.68	$37,015.21	11,623	353	20	32,241	2.8	$104.76	$1.15

Cost per mile, overhead, $0.30; cost per mile, flying, $0.24; cost per mile, maintenance, $0.61.

Note. Plane No. 39-A, Curtiss HA, equipped with Liberty 12 motor.
Plane No. 49, Curtiss R4, equipped with Liberty 12 motor.
Planes Nos. 60 to 108, inclusive, and 24227, De Havilands, equipped with Liberty 12 motors.
Plane No. 111, Twin De Haviland, equipped with two Liberty 6 motors.
Planes Nos. 201 to 206, inclusive, Martins, equipped with 2 Liberty 12 motors.

* Rebuilt.

† Includes part of cost of moving station from Belmont, N. Y., to Newark, N. J.

CHICAGO-OMAHA TRIAL FLIGHTS

														hr.	min.				
104	$61.43	$6.00	$23.54	....	$4.50	....	$60.50	$28.00	....	$4.50	$8.00	$196.47	220	6	01	674	3.1	$32.64	$0.29
105	43.57	5.10	23.55	....	4.50	....	48.27	41.33	....	22.00	37.93	226.25	150	4	48	437	2.9	47.10	.52
107	36.64	....	23.55	....	4.50	....	37.71	21.71	$32.00	4.50	6.17	166.78	130	3	45	215	1.7	44.46	.78
Total	$141.64	$11.10	$70.64	....	$13.50	....	$146.48	$91.04	$32.00	$31.00	$52.10	$589.50	500	14	34	1,326	2.7	$40.46	$0.44

OTTO PRAEGER, Second Assistant Postmaster Genera

FIAT TWELVE-PASSENGER AEROPLANE

AERIAL AGE is this week enabled to present an exclusive description of the latest Fiat product, a twelve-passenger biplane. It is a big biplane with completely rigid body and central fuselage carrying the engine apparatus, the controlling cabin, the passenger cabin, the toilet closet, and all other installations required by modern comfort for a long journey.

The outstanding characteristics of the aeroplane are as follows:

Combined triple-engined apparatus controlling one tractor propeller placed in front of the fuselage.

Splendid situation of the maneuvering cabin, between the engine apparatus and the wing system, ensuring a very wide sight-range to the pilot and his mechanic, an easy control of all the parts of the engine, and if necessary their partial substitution when damaged.

Comfortable and very strongly built passenger cabin, with good sight range, and with a central passage allowing the displacement of the passengers and of the crew.

Spar structure of the body entirely rigid and fuselage in trellis-work covered with ply-wood in order to ensure a high factor of safety.

Speed exceeding 125 miles per hour.

Minimum speed lower than 50 miles per hour.

Four-wheeled landing carriage, which in connection with limited minimum speed ensures easy and safe landing.

The patented Fiat triple-engined apparatus adopted for this aeroplane represents an interesting solution for avoiding the serious troubles and dangers arising from stoppage of working in the single engine planes. To this end the subdivision of the motive power in many units situated along the body, each unit controlling its own propeller, has not been adopted.

The Fiat triple engine retains all the advantages peculiar to the sub-division of power, and thus opens a new era in the future of aviation.

A special device of engagement and disengagement serves to disengage automatically any one engine which should reveal troubles in its working; the disengagement or engagement of an engine may also be controlled by a simple maneuver of the pilot, who can thus alternate and combine according to his wants the working of the three elementary engines in all possible ways.

More especially the pilot may stop the particular engine which gives signs of bad working, so that the mechanic may proceed to those small repairs which are possible to execute when flying, while the other two engines are in every case sufficient to keep the aeroplane going.

The stoppage of one of the three engines results only in a lesser number of revolutions of the propeller, and a decrease in the speed of the aeroplane, which, however, even in the worst cases, cannot diminish under 110 miles per hour.

Besides, the three-engine Fiat apparatus is designed with the capability of a by far greater power than the horsepower required for the normal propelling of the aeroplane, so that under normal conditions the engines never work at full load or with overload, while in emergency cases there is a remarkable margin of horsepower available.

It was deemed of the highest importance to proceed with the greatest attention to a conscientious estimate of all the external forces soliciting the machine such as the normal load, the passive resistance to advancement, the motor couple, the dissymetrical load, the inverted load, etc., either considered separately or combined between them in all possible ways capable to be realized when flying.

After the most accurate examination of the external forces, another examination was made of all the internal stresses, according to the most modern and rational methods of the science of construction. At the same time it was endeavored to take away, as already done in the body, as much as possible hyperstatical resistances in the structures, which, owing to the uncertainty reigning about the factors of elasticity of the different materials used in the construction, may cause erroneous estimations of the valuation of the stresses to which the single elements are subject.

The factor of safety higher than *eight* guaranteed for the aeroplane and effectively obtained in every one of its parts, is more than sufficient to guarantee the machine against every surprise even during bad weather conditions. A still greater attention was paid to the study of such essential parts as controlling planes, rollers for control transmission, internal brackets for parts, propeller, piping, tanks, supporting framework of cabin, etc.

A special attention has been paid to the main fastenings, endeavoring that they, besides answering the condition of resistance established by the calculation, gave, owing to their shape, a guarantee of perfect workmanship.

The body of this aeroplane is a completely rigid trellis-work, so that the whole has got a greater indeformability.

The rigid spar work hinders the twisting of the machine, occurring with time, spares a long set of superadded keel-shapes which with difficulty would stand a continuous use and gives at the same time a reassuringly strong aspect and a better streamlined shape.

In order to raise the drift center and guard the aeroplane in the safest way against the danger of a wing glide, the lower wing has a remarkable V approximately of 2 degrees. The distance between the wings is equal to 85 per cent of their depth.

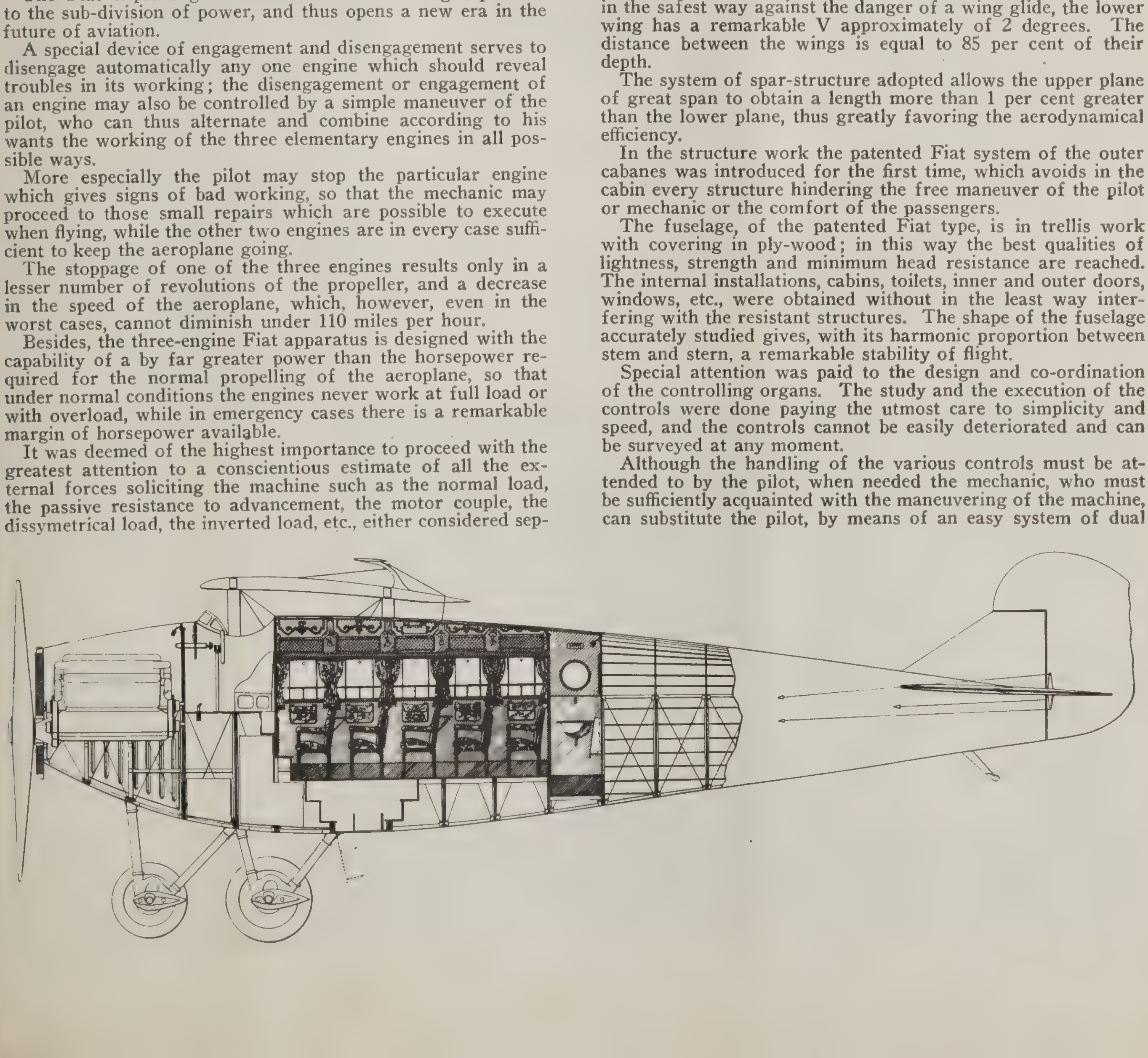
The system of spar-structure adopted allows the upper plane of great span to obtain a length more than 1 per cent greater than the lower plane, thus greatly favoring the aerodynamical efficiency.

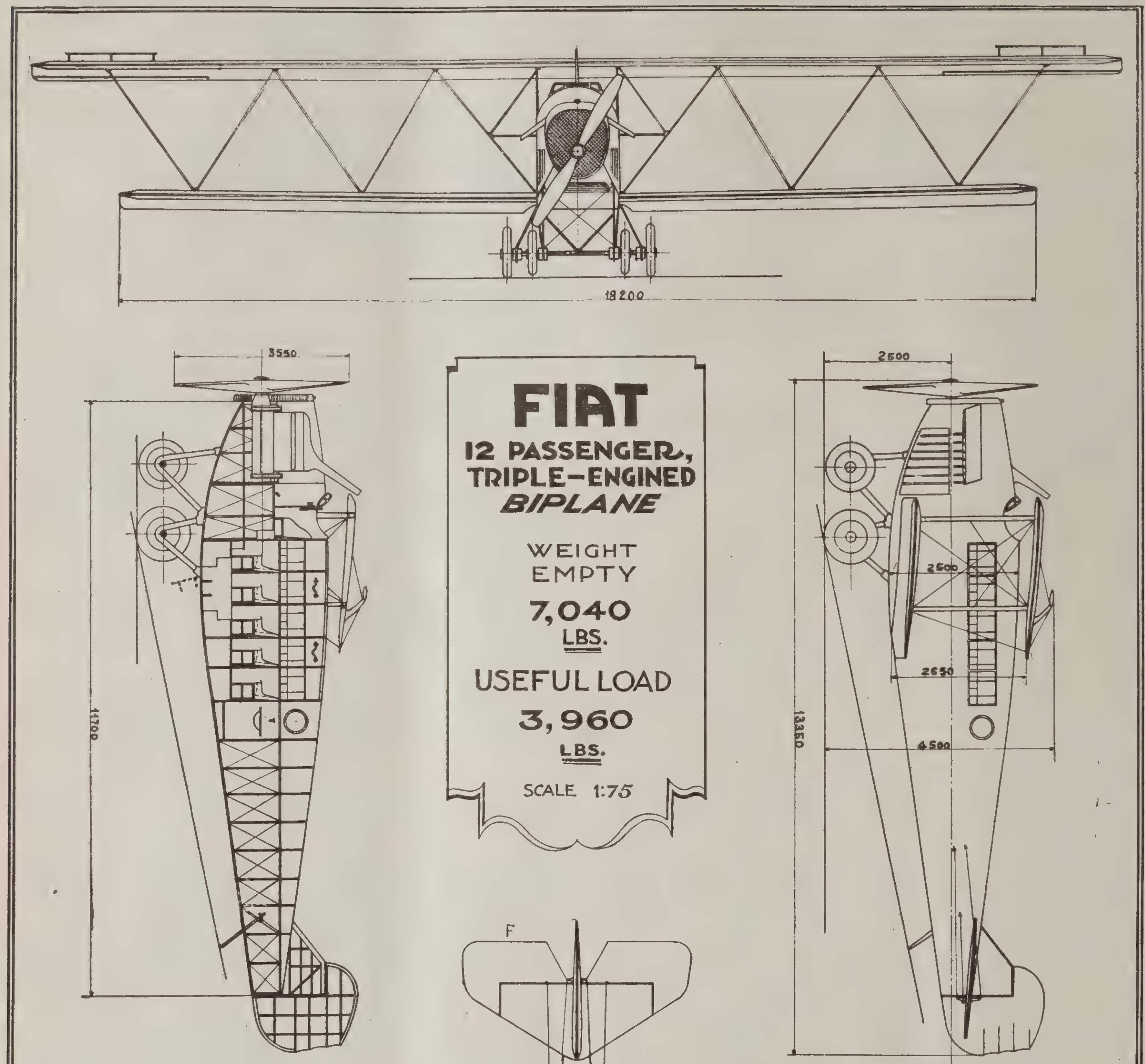
In the structure work the patented Fiat system of the outer cabanes was introduced for the first time, which avoids in the cabin every structure hindering the free maneuver of the pilot or mechanic or the comfort of the passengers.

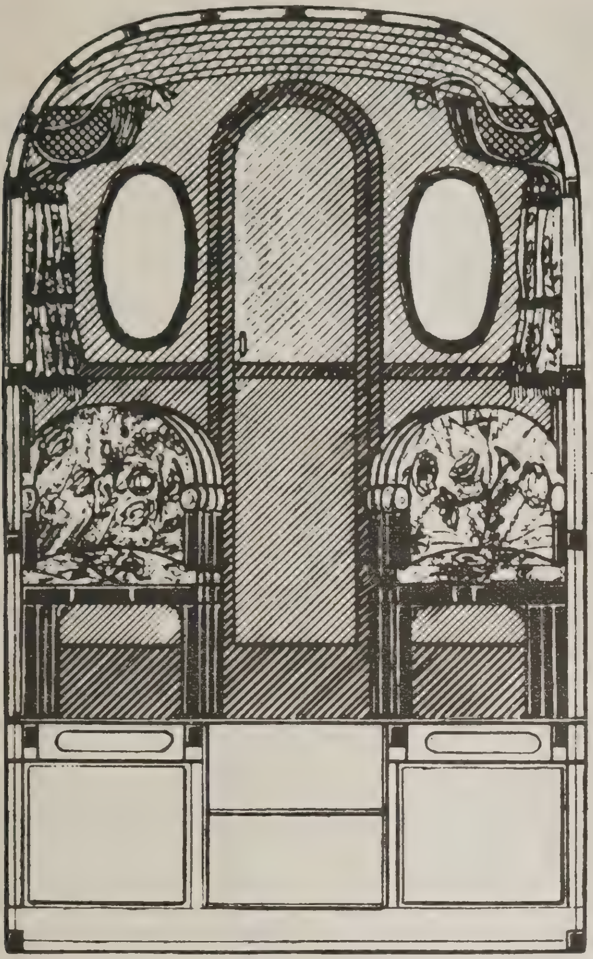
The fuselage, of the patented Fiat type, is in trellis work with covering in ply-wood; in this way the best qualities of lightness, strength and minimum head resistance are reached. The internal installations, cabins, toilets, inner and outer doors, windows, etc., were obtained without in the least way interfering with the resistant structures. The shape of the fuselage accurately studied gives, with its harmonic proportion between stem and stern, a remarkable stability of flight.

Special attention was paid to the design and co-ordination of the controlling organs. The study and the execution of the controls were done paying the utmost care to simplicity and speed, and the controls cannot be easily deteriorated and can be surveyed at any moment.

Although the handling of the various controls must be attended to by the pilot, when needed the mechanic, who must be sufficiently acquainted with the maneuvering of the machine, can substitute the pilot, by means of an easy system of dual




18200
3550
11700
FIAT
12 PASSENGER,
TRIPLE-ENGINED
BIPLANE
WEIGHT
EMPTY
7,040
LBS.
USEFUL LOAD
3,960
LBS.
SCALE 1:75
2500
2500
2650
6500
13350
F
21000
3200
600
500
1550



control, or taking in hand the controls generally handled by the pilot.

Owing to the average duration of the journey which for a length of 600 miles is about 5 or 6 hours, in order not to fatigue and over-strain the pilot, by means of judicious compensation of the surfaces, the effort to exercise on the control levers was minimized. While the ordinary compensation system was considered more than sufficient for the direction and depth rudders, for the ailerons the patented Fiat biplane type was adopted, which has already practically given the best results.

Owing to the fact that in a certain way the travelers are to be considered as a variable load, so that before any flight a rather long centering operation ought to have been gone through, the fixed tail plane adjustable in flight at the pilot's will was adopted. This system is of the greatest convenience to obviate uncenterings of a short duration which may take place as a consequence of a change of position by one of the travelers.

A requirement for big aeroplanes is a very large sight-range for the pilot, which is indispensable to effect safe landings. The position chosen in this aeroplane places the pilot in the open completely out of the body, near the right-hand side of the fuselage.

The commanding cabin, by means of a sliding door, is in direct communication with the passenger cabin, so that the maneuvering crew (pilot and mechanic) can by turn go down to the passenger cabin to take a little rest. The commanding cabin, for safety reasons, is completely open above; in front a special diaphragm presents the free passage of the warm air passed through the engine and radiators. A big opening with a sliding door made in said diaphragm allows a passage for the mechanic to inspect the engines.

In this aeroplane the central cabin, very wide, allows a free development to all resisting structures. The disposition of the seats, the central passage, and toilet closet, at the end of the passage aft, give to the whole the look of a nice and comfortable cabin, which can be compared only to the best cars of the modern trains de luxe. A rational disposition of the windows allows a very wide sight range to the passengers, while the central part of the windows by means of a sliding device, permits a communication between inside and outside if desired for changing air or for bending outwards in order to better admire the landscape above which the aeroplane is flying. The cabin is capable of ten passengers, besides the crew. Entry in the aeroplane takes place by means of lowering stairs, under the passenger cabin.

All projecting single parts were designed in accordance with the laws of air resistance and in order to get the better shape even when complex and expensive constructions were required. The shape of the bilging parts and of the propeller was designed in order to ensure the best streamline. The rigid spar structure, the shape of fuselage, the simplicity of the landing carriage did also greatly contribute to reduce all passive resistance. For these reasons, notwithstanding the power of 700 H.P. utilized, relatively low with regards to the total weight of 11,000 lbs., it was possible to get the high speed of 125 miles per hour, which up to date was only reached in the most perfect chasing planes, and the theoretical maximum limiting height at full load of 15,000 feet.

The fuel and oil tanks were designed with a capacity greatly superior to the ordinary load required, so that they may be sufficient for a flight of 8 hours, thus ensuring a radius of action of over 600 miles, when it is possible to start either with a lesser load of passengers or in very favorable weather and altitude conditions that allow the aeroplane to start overloaded.

It will be seen that the radius of action of the aeroplane is normally 600-750 miles, and in exceptional cases 800-950 miles, with a possible over-load of fuel. This aeroplane could consequently with only a few stops accomplish flights of great distance, such as London-Cairo (about 2,400 miles).

By means of special patented devices, owing to the great variety between the maximum and the minimum carrying speed, the landing can take place at a very reduced speed and consequently under very favorable conditions.

The Fiat aeroplane for carrying twelve persons, studied and designed in accordance with the principles and methods set forth above, will certainly mark a decisive progress in the development of civil aviation.

Characteristics of the Fiat twelve-passenger aeroplane:

			Pounds
Weight empty			7,040
Useful load.	Fuel and oil	1,650 lbs.	3,960
	Board equipment and radio	110 lbs.	
	Crew	330 lbs.	
	10 Passengers and luggage	1,870 lbs.	
Weight loaded			11,000
Power of the engine apparatus.	maximum, 1850 r.p.m.—900 h.p.		
	normal, 1600 r.p.m.—700 h.p.		

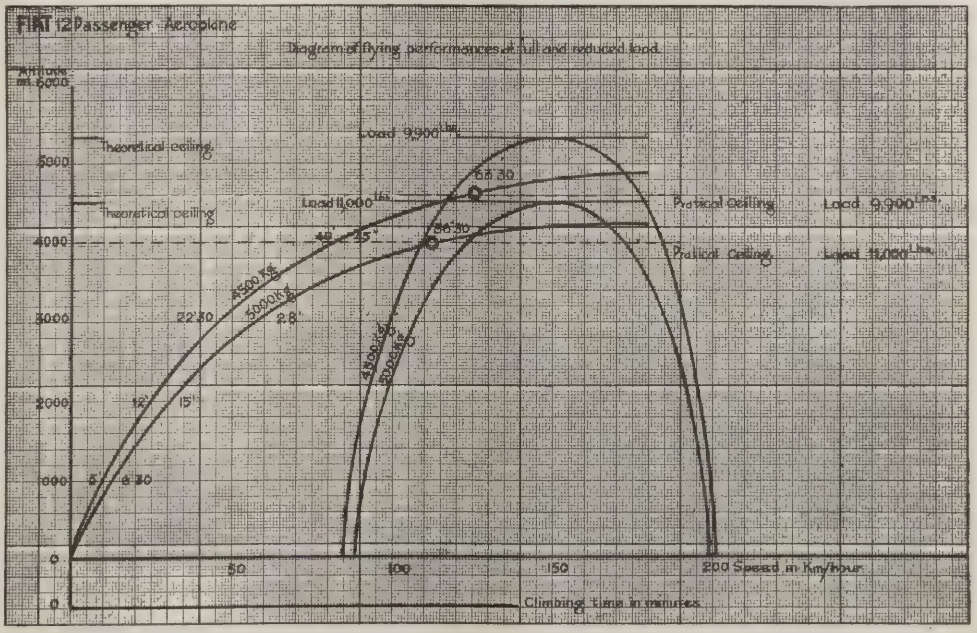


Diagram of flying performance at full and reduced load

DETERMINATION OF THE PRESSURE LAW FOR WING SURFACES

By S. E. SLOCUM, Ph. D.

As the result of experiments made in the early days of aeronautics, it is commonly assumed as a basis for practical calculations that the wind pressure on a flat plate or on a wing surface varies as the square of the relative velocity. For a flat plate of infinite extent, normal to the wind, this assumption is probably correct. It is well known, however, that for an ordinary wing surface the angle of inclination of the surface to the wind as well as its aspect ratio affect this result materially, and the law of the square is therefore modified empirically to take account of these factors.

Since the law of wind pressure is of such fundamental importance in aerodynamics, it is essential to determine as nearly as possible the exact form of this law. The most rational method of analysis is to apply the method of Least Squares to the most reliable experimental data obtainable. The purpose of the present article is to indicate how such an analysis may be made. The experimental data used for this purpose are taken from the classic work of Eiffel, as no data could be found more suitable for the purpose, or with a greater weight of authority, and represent the results of experiments made by him on a Mallet wing. The results of this analysis, however, are not to be regarded as establishing a general law, but to serve as an example of how the variation in wind pressure on an actual wing surface may be studied, and to indicate how far the results may be expected to deviate from the law of the square. It is clearly shown that in general the law of the square is only roughly approximate, and also that the resultant pressure is not directly proportional to the inclination of the wing, but is some function of this inclination.

Eiffel's experiments on the Mallet wing were made at three wind velocities, namely, 6 m/sec., 10 m/sec. and 14 m/sec. Eiffel assumed, however, that the law of the square applied to these results, and accordingly reduced all his data to an equivalent velocity of 10 m/sec. In order to use these data for the purpose of the present analysis, the values corresponding to 6 and 14 m/sec. were first transformed back to their original or true values. The data to be discussed then appear as follows:

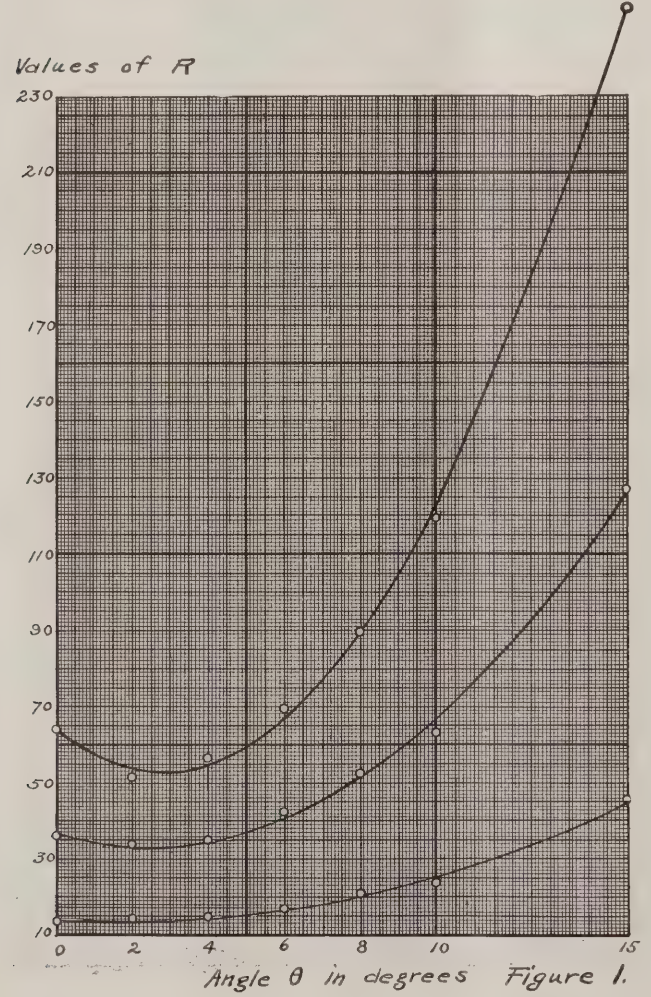


Figure 1.

θ	R		
	V = 6	V = 10	V = 14
0.	13.572	35.9	63.504
2.	13.896	33.7	51.156
4.	14.508	34.8	56.448
6.	16.776	42.2	69.188
8.	20.628	52.5	89.180
10.	23.256	63.0	119.56
15.	45.468	127.0	252.84

where θ = angle of inclination in degrees,
v = velocity of flow in meters per second,
R = total pressure in grams in direction of flow,
A = area of wing surface = .1344 square meters.

The first step is to determine the exponent, n, of the velocity in the general expression

$$R = K A V^n$$

where K is some function of the inclination. For this purpose we proceed to determine n independently for each inclination. The method of doing this by the Method of Least Squares will be explained for the first case, $\theta = 0$.

Applying logarithms to the above expression, we have

$$\log R = \log K + \log A + n \log V.$$

Since K is constant for a given inclination, and the area A is also constant, this may be written

$$\log R = C + n \log V$$

where C and n are now the unknown quantities to be determined. Substituting the tabular values of R and V for $\theta = 0$, we obtain three observation equations, as follows:

$$\begin{aligned} 1.132644 &= C + .778151\ n \\ 1.555094 &= C + 1.000000\ n \\ 1.802801 &= C + 1.146128\ n \end{aligned}$$

Now the method of least squares requires that from such a set of observation equations a set of normal equations shall be formed, one for each of the unknown quantities. The normal equation for any given unknown is found by multiplying each observation equation by the coefficient of this unknown in that equation, and then adding the results. For example, to form the normal equation for n, multiply the first observation equation through by .778151, the second by 1, and the third by 1.146128, and add the resulting equations. Since the coefficient of C is 1 in each equation, the normal equation for C is found by simply adding the observation equations as they stand.

The two normal equations obtained in this way for $\theta = 0$ are then

$$\begin{aligned} 4.490448 &= 3\ C + 2.924279\ n, \\ 4.502622 &= 2.924279\ C + 2.919128\ n \end{aligned}$$

Solving these simultaneously, we obtain

$$\begin{aligned} n &= 1.828, \\ C &= -\ .285043 \end{aligned}$$

Proceeding similarly with each of the other inclinations, we obtain the following results:

θ	N	C	K
0.	1.828	—.285043	3.860
2.	1.554	—.054930	6.557
4.	1.613	—.087415	6.084
6.	1.683	—.077174	6.229
8.	1.736	—.030537	6.935
10.	1.934	—.137367	5.423
15.	2.024	+.082073	8.988

The arithmetic mean of these values of n is found to be

$$n = 1.767$$

which differs considerably from n = 2, as assumed in the law of the square.

The pressure law now becomes

$$R = K A V^{1.767}$$

and the next step is to determine K; that is, the effect of the inclination of the surface to the direction of the wind. Since K is some unknown function of θ, the first step is to plot K and θ as abscissa and ordinate to see if there is any visible relation between them. The result in this case was a curve for which a parabola seemed to be the nearest and simplest approximation. Assume therefore that

$$K = a + b\,\theta + c\,\theta^2$$

and proceed to determine the coefficients a, b, c, in accordance with the method of least squares.

Substituting the value of θ and the corresponding values of K calculated from the relation

$$R = K A V^{1.767}$$

for V = 10, we thus obtain the following set of observation equations:

$$\begin{aligned}
4.568 &= a \\
4.288 &= a + 2\,b + 4\,c \\
4.428 &= a + 4\,b + 16\,c \\
5.369 &= a + 6\,b + 36\,c \\
6.680 &= a + 8\,b + 64\,c \\
8.016 &= a + 10\,b + 100\,c \\
16.160 &= a + 15\,b + 225\,c
\end{aligned}$$

Forming the normal equations for a, b, c, in the manner explained above, the results are

$$\begin{aligned}
7.0727 &= a + 6.4286\,b + 63.571\,c \\
9.6556 &= a + 9.8889\,b + 115\,c \\
11.5649 &= a + 11.6292\,b + 148.964\,c
\end{aligned}$$

The solution of this set gives

$$\text{For } V = 10 \quad \begin{cases} a = 4.6824 \\ b = -.3728 \\ c = .0753 \end{cases}$$

Carrying out the same process for V = 6 and V = 14, the results are

$$\text{For } V = 6, \quad \begin{cases} a = 4.4808 \\ b = -.2549 \\ c = .05972 \end{cases}$$

$$\text{For } V = 14, \quad \begin{cases} a = 4.4716 \\ b = -.5339 \\ c = .09438 \end{cases}$$

The expression for K in terms of θ are then as follows:

$$\begin{aligned}
V &= 6;\ K = 4.4808 - .2549\,\theta + .05972\,\theta^2 \\
V &= 10;\ K = 4.6824 - .3728\,\theta + .0753\,\theta^2 \\
V &= 14;\ K = 4.4716 - .5339\,\theta + .09438\,\theta^2
\end{aligned}$$

The following table shows how closely the observed values of R agree with the values calculated from the formula

$$R = K A V^{1.767}$$

in which K is given by the relations just obtained.

θ	V = 6		V = 10		V = 14	
	R Obs.	R Calc.	R Obs.	R Calc.	R Obs.	R Calc.
0	13.57	14.28	35.9	36.80	63.50	63.69
2	13.90	13.42	33.7	33.31	51.16	53.86
4	14.51	14.08	34.8	34.55	56.45	54.78
6	16.78	16.26	42.2	40.53	69.19	66.46
8	20.63	19.96	52.5	51.24	89.18	88.89
10	23.26	25.19	63.0	66.68	119.56	122.07
15	45.47	44.82	127.0	126.01	252.84	252.09

These results are also shown graphically in Figure 1, the curves shown in this figure representing the formulas for R corresponding to the three expressions for K, and the circles representing the observed values of R.

In order to obtain a general formula for R which will hold for all values of V, it is necessary to combine the three expressions for K into a single formula. For this purpose, first plot the three sets of values of the coefficients a, b, c, using V as abscissa, as shown in Figure 2. From this graphical representation it is evident that the coefficient *a* may be assumed to be constant, and that the other two coefficients may be represented by straight lines, namely,

$$\begin{aligned}
b &= m\,V \\
c &= p + q\,V
\end{aligned}$$

The general expression for K will now be of the form

$$\begin{aligned}
K &= a + b\,\theta + c\,\theta^2 \\
&= a + m\,V\,\theta + (p + q\,V)\,\theta^2 \\
&= a + p\,\theta^2 + V\,(m\,\theta + q\,\theta^2)
\end{aligned}$$

where a, m, p, q are the unknows to be determined.

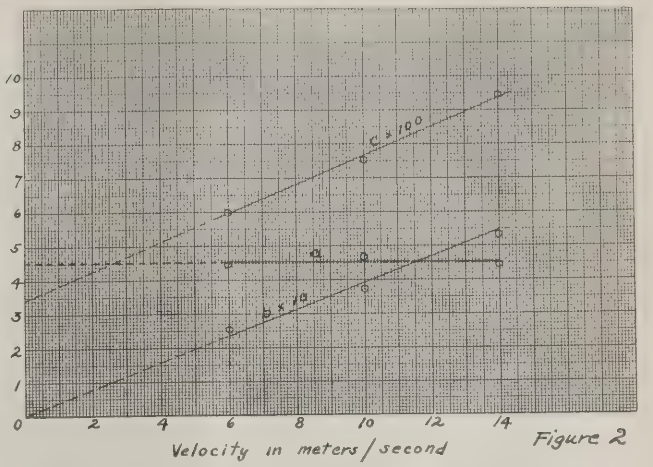


Figure 2

Returning to the original observed data, and substituting in this last relation, we obtain a set of twenty-one observation equations. From these observation equations a set of four normal equations for the four unknowns a, m, p, q, are formed as explained previously, these normal equations being as follows:

$$\begin{aligned}
145.256 &= 21\,a + 1335\,p + 1350\,m + 13370\,q \\
15158.127 &= 1335\,a + 198867\,p + 155250\,m + 1988990\,q \\
13065.458 &= 1350\,a + 155250\,p + 147740\,m + 1719220\,q \\
156163.350 &= 13370\,a + 1988990\,p + 1719220\,m + 21997308\,q
\end{aligned}$$

Solving these equations simultaneously, the results are

$$\begin{aligned}
a &= 4.6799 \\
m &= -.04202 \\
p &= .0231 \\
q &= .00545
\end{aligned}$$

Consequently the general expression for R is found to be

$$R = K A V^{1.767}$$

$$\left[4.68 + .023\,\theta^2 + V\,(-.042\,\theta + .00545\,\theta^2)\right] A V^{1.767}$$

(Continued on page 200)

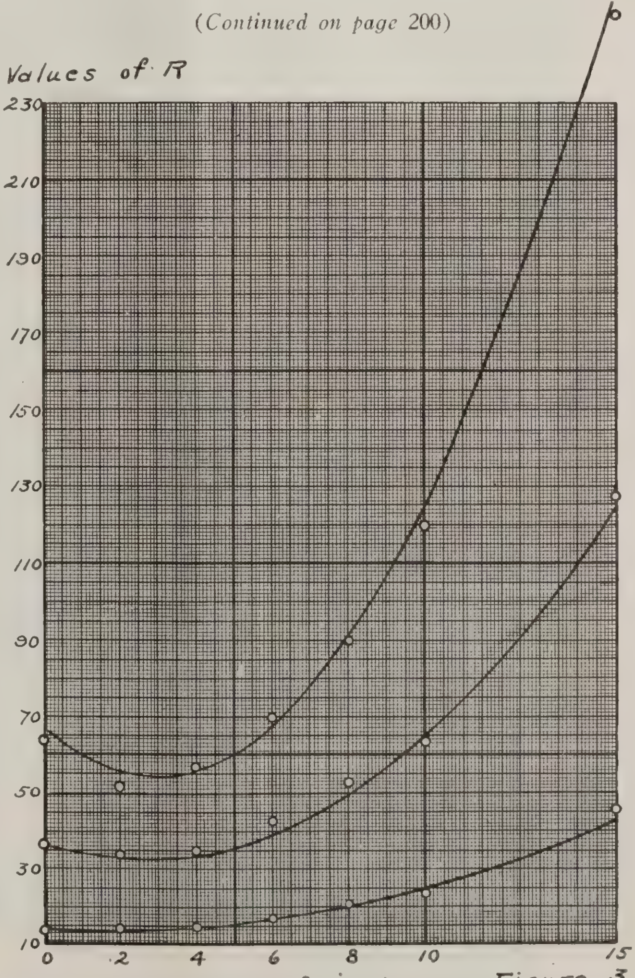


Figure 3

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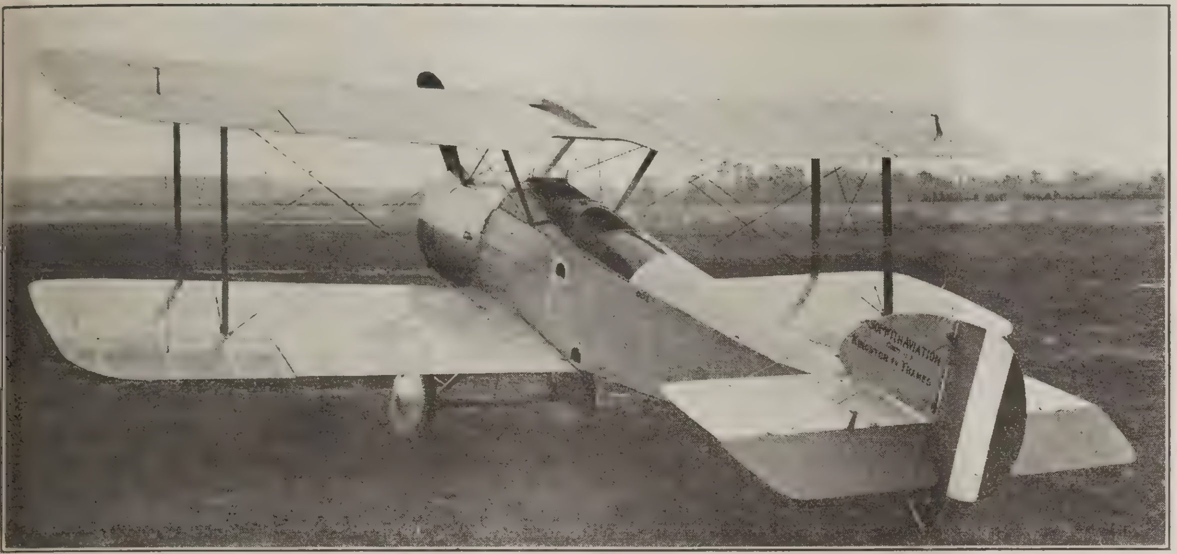

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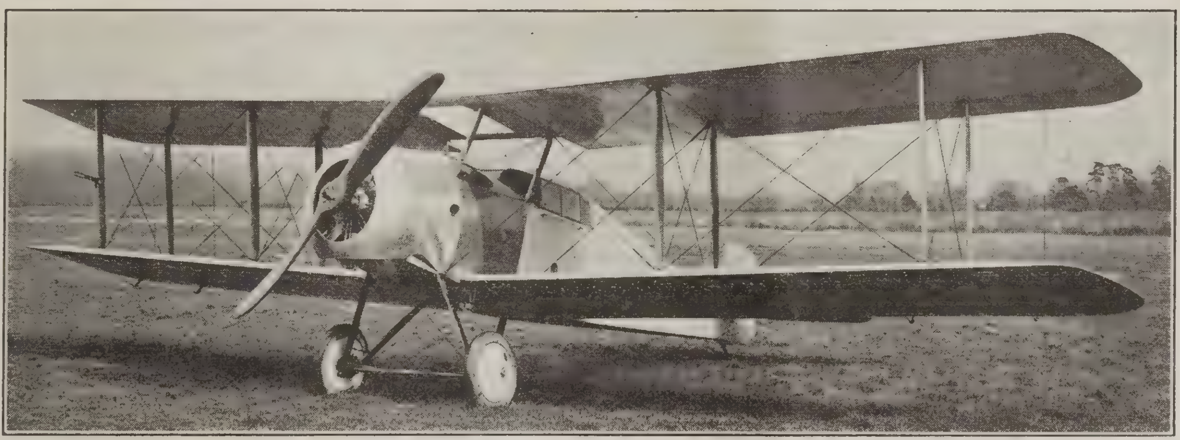

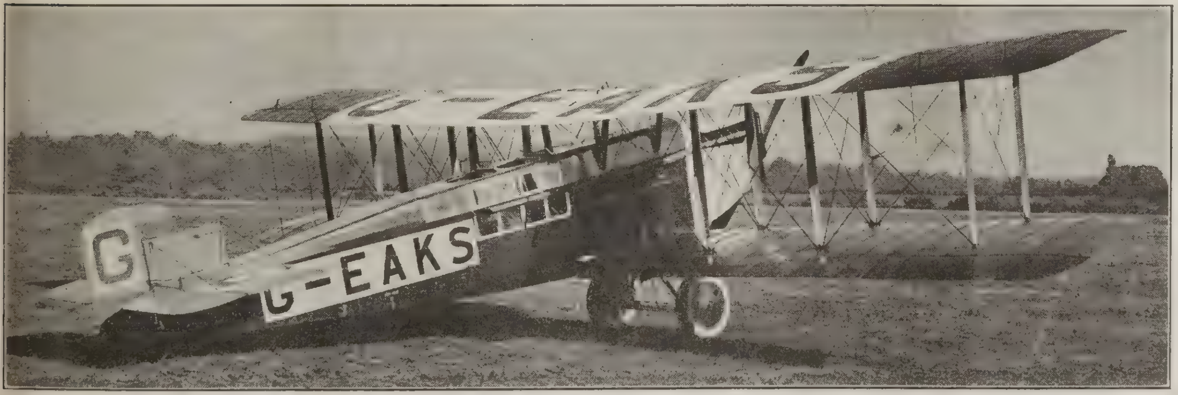

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REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Reasons Given for Disque's Army

Various reasons have been given for gathering over 28,000 enlisted men and 1,200 officers around Portland, including about 500 at headquarters, and then farming soldiers out to work in the woods and on railways under contractors who gave them poor board and poor quarters, according to testimony before the committee, and who collected from the Government civilian pay ranging from $3.50 to $8 per day, less the compensation fixed by Congress. In the construction of the Lake Crescent Railroad the subcontractors even collected a commission on the civilian pay of the soldiers in excess of compensation fixed by law.

Soldiers were needed in France in the trenches and in every arm of the service. Col. Kelly was using soldiers lumbering in the Vosges Mountains in six feet of snow and zero weather at $1 a day each. Men in the lumber camps near the front were under fire and occasionally killed, men in the trenches and in aeroplanes were frequently killed, but back in Oregon and Washington, 6,000 miles from the front, Col. Disque, a modern soldier of fortune, set up an autocratic pompous military establishment that rivaled anything ever possessed by any European or Asiatic potentate.

Excuse was offered that these soldiers were needed to suppress the I. W. W., but no evidence of any sabotage or of any organized attempt at sabotage or rioting was presented to the committee among the many thousands of men employed in the woods and mills of Oregon and Washington. It is believed to be the first time, in peace or in war, that the War Department ever tried to buy peace by fixing American soldiers' duty at eight hours per day with civilian pay.

According to Maj. Sligh, Howard E. Coffin, chairman of the Aircraft Board, was advised in August, 1917, that four companies of United States troops would quell all disturbances that might occur on the coast. Coffin requested these troops from the Secretary of War, but his request was refused p. 580).

It has been urged in some quarters that Disque's peculiar organization of soldiers was a haven for slackers. According to the testimony, doctors, teachers, clerks, and others were sent to Portland from New York, Ohio, and all over the country, who had no knowledge of logging, lumbering, and no qualifications of value in the woods or mills. Safety may have attracted some of those in the Disque army, but from the testimony it is certain that very many of his men would have preferred regular service with our troops in France.

Col. Disque's army was gathered together ostensibly to help the labor situation and thereby permit commercial operations to continue, and soldiers were given by him to different cost-plus contractors and commercial operators for labor in woods and mills.

The most persuasive argument advanced by witnesses for gathering together this large army was that Col. Disque was inordinately ambitious for a star on his shoulder, which was reasonably assured if 30,000 soldiers were placed under his command.

Disque Wanted to Be a Major-General

A reason for the frantic rushing of troops across the continent to Col. Disque at his insistence is disclosed, apparently, on page 1421, where Col. Disque testified: "Had they given me the rank commensurate with my job I would have been a major general." No better evidence of Col. Disque's purpose and his high estimate of his own abilities need be offered.

Col. Kelly, in France, was building mills and getting results and was rewarded with a lieutenant colonelcy; Pendleton, without soldiers or pay or emoluments, other than grateful thanks, was doing wonders in Canada; Capt. Rickenbacker, in second-rate foreign planes, was setting a pace in aviation for American valor with only the modest title when discharged of "captain"; thousands of brave officers and hundreds of thousands of splendid American soldiers were fighting in France without hope of reward or recognition, while Col. Disque, who reached a captaincy after 19 years of Army service, was given a large army in peaceful Oregon and sat in his office thousands of miles from the battle front peeved because he could not have a major generalship (p. 1421).

Director Ryan's promise to Col. Disque of a brigadier generalship and Col. Disque's pompous military surroundings in the Yeon headquarters building at Portland, so dear to a man who had been 19 years in rising to a captaincy, in part explains what was humorously known on the coast as Disque's "Army of the Yeon."

Aircraft Needs of Soldiers Working 72-Hour Shifts

A brief extract from testimony voluntarily offered the committee is here submitted, lest we forget.

Capt. W. O. McKay, of Seattle, a reputable witness, was in the war for two years. He was a member of the Ninety-first Division which with the Thirty-second and Thirty-seventh held the enemy at a standstill and then drove them back in the Argonne Battle during nine days from September 26 to October 4, near the close of the war (p. 1007-13). Capt. McKay was liaison officer of the Third Battalion, One Hundred and Sixty-fourth Infantry, with duties "to see that my particular battalion was connected up with the aeroplane" (p. 1008). Heavy casualties resulted in the Argonne Battle and one company of 134 men lost over half its number (p. 1009). His description of trench fighting is forceful:

> Capt. McKay. During the Argonne battle . . . the German aeroplanes would come and shoot us up, . . . rake us on one side and then on the other with their machine guns (p. 1008).
>
> Mr. Frear. How low would they fly when they were using their machine guns?
>
> Capt. McKay. They would come down as low as this roof.

Speaking of the effect on the morale, he said:

> The sensation is pretty bad at first, but after you go three days with very little to eat, with a can of tomatoes and a little water and you do not get any sleep, but are under shell fire constantly, you do not mind it much.
>
> Mr. Magee. You did not have a fighting plane to protect you?
>
> Capt. McKay. No; I never saw an American plane go after the Germans (p. 1013).

Soldiers in France were not worrying over generalships, medals, eight-hour shifts, or civilian wages. They only begged for fighting aeroplanes and a chance to fight, eat and sleep.

A letter received by a member of this committee during the war was read into the evidence to Secretary Baker. This letter from a soldier at the front with the Thirty-second Division in part is as follows:

> I was never more proud of my country than I have been since I came to this location. I have seen our soldiers going in and out of the hospitals. Their spirit is the most wonderful thing you ever saw in your life. They say the casualties in our division (Thirty-second) are quite large, but the efforts of our soldiers cannot be surpassed.
>
> Just keep on lending them all the assistance possible. No one deserves more. If you will only send us more aeroplanes—and then more and more, it will hasten the finale. The men are coming through fine, but the aeroplanes have disappointed us. We depend upon these so much more than you appreciate (p. 46).

That was the spirit shown by the American soldiers in France. In response to such urgent requests the only American machines ever sent to our fighting soldiers on the front during the 19 months of war were a handful of utterly unsafe observation planes.

(*To be continued*)

NAVAL *and* MILITARY AERONAUTICS

Air Service to Train Civilians in Flying

The Director of Air Service announces the Air Service of the Army is now in a position to train civilians in the art of flying, and is desirous of receiving applications from all civilians interested. The men accepted will be classed as cadets while in training and will receive $75 per month in addition to their allowance. Only civilians between the ages of 20 and 27 years, inclusive, who have at least the equivalent of a high school education, are eligible for appointment as flying cadets.

Civilians desiring to qualify for appointment should communicate with any of the following:

Director of Air Service, Washington, D. C.; Department Air Service Officer, Central Dept., 230 E. Ohio St., Chicago, Ill.; Department Air Service Officer, Eastern Dept., Ft. Schuyler, N. Y.; Department Air Service Officer, Northeastern Dept., 99 Chauncey St., Boston, Mass.; Department Air Service Officer, Southeastern Dept., 206 Riggs Bldg., Charleston, S. C.; Department Air Service Officer, Western Department; Sante Fe Bldg., San Francisco, Calif.; Department Air Service Officer, Southern Dept., Ft. Sam Houston, Texas.

British to Train U. S. Airship Pilots

London.—The officers and men from the aviation branch of the United States Navy, who will arrive here soon, will undergo about a year's training with rigid airships under British Royal Air Force Commander L. H. Maxfield, who will pilot the R-38 to America.

From this force officers and crew will be selected to take home the mammoth airship now building at Bedford for the American Navy. They will train at the British aid base at Howder, East Yorkshire, and, it is expected, will fly the ship over in the spring of 1921.

Army To Do Aeroplane Forest Fire Patrol

The Secretary of War has directed the Commanding General of the Western Department that, at the request of the Department of Agriculture, the War Department will institute an aeroplane forest fire patrol this year as was done last year. The use of the 9th Aero Squadron, now stationed at Rockwell Field, California, is contemplated for this work. In the forest fire patrol the Director of Air Service will cooperate with the Department of Agriculture. The planes used are equipped with radio and communicate constantly with fire observation stations in the district patrolled, all of which are equipped with special radio, telephone and telegraph stations installed and operated by the Signal Corps. The Department of Agriculture now has twenty men taking a course of study at March Field which is intended to cover liaison work between the air and ground in forest fire patrol.

Photographic School—Langley Field, Virginia

The thirteen weeks' instruction at the U. S. A. School of Aerial Photography, Langley Field, Hampton, Virginia, embraces courses in the following subjects:

Aerial camera manipulation, installation and repair, chemical formulæ, negative making, printing and enlarging, lantern slide making, stereoscopic photographs, copying, photographic reconnaissance and mosaic making, photographic interpretation, practical photography in the field.

In addition to the enlisted men assigned to the school, instruction in aerial photography is being given to all aeroplane pilots and observers at the post.

New Landing Gear Struts for De Havilands

The De Haviland 4-B and 4-B1 are to be equipped with new landing gear struts which are so arranged that the wheels set several inches farther forward than in the present design. The new installation will materially remedy the tendency of the D. H.'s to nose over easily on account of their high landing speeds.

Coast Guard Gets Navy Air Station

The Navy air station at Morehead City, N. C., has been turned over to the Coast Guard for its aviation activities. The Navy leased a part of the land from the State and equipped it with the necessary buildings and hangars and the Coast Guard plans to put the station in commission shortly.

Plan Aerial Medical Branch

Creation of a special aviation medical service in the Army Medical Corps is expected to materially reduce fatalities among the flyers on active service, according to an official announcement. Statistics compiled by British military authorities were quoted as showing that during the first year of the war 90 per cent of the deaths among British aviators were recorded as due to physical defects of pilots, 8 per cent to defective planes and 2 per cent to enemy activity.

After the establishment of the air medical service, which made a special study of the qualifications necessary in an aviator, the percentage of deaths due to the faults of the pilots was reduced to 12.

Col. Fravel Ordered to Texas

Col. Ira. F. Fravel, Air Service, at Langley Field, Hampton, Va., has been assigned to the command of Brooks Field, San Antonio, Tex.

New Aviation Storage Plant at North Island, Calif.

Several of the steel expeditionary hangars at Ream Field are to be removed to Rockwell Field according to an announcement from Major Roy Kirtland, newly appointed commandant of the Army Air Service station on North Island. Three hundred thousand square feet of floor space will be needed at the island to house aeronautical supplies and stores to be moved there from the storage depot at Los Angeles. Major F. R. Knight is to be in charge of the storage and repair depot.

Testing the first Chinese Government Handley-Page biplane at Pekin. China has ordered six Handley-Pages to use for aerial transportation, to supplement railway service on the Mongolian frontier

FOREIGN NEWS

Race for Flying Boats in Spain

Barcelona, Spain.—An international hydroaeroplane race meeting has been arranged for May 23-28. The flying boats will compete over a course laid from Barcelona to Palma and Valencia and return, a distance of about 300 miles. The first prize will be 30,000 pesos and the second 10,000 pesos.

The Aero Club of Catalonia is endeavoring to have the aviators competing at the Monaco meet come here for the race, and hopes also that entries will be received from American and British fliers.

French Aviators Finish Trip from Paris to Dakar

Paris.—Major Vuillemin and Lieutenant Chalus, two French aviators, have arrived at Dakar, having flown across the Sahara Desert, a distance of 3,500 miles.

They left Villa Coublay, near Paris, on January 26 for Algiers on the first stage of their long journey, and after a short wait at Algiers flew to Tamarasset, half-way across the desert, reaching there on February 17.

At that place their aeroplane was damaged, and it was not until a month later that they left Tamarasset for Segou on the Niger River. They remained at Segou for forty-eight hours and then proceeded to Gao, thence to Bourem and from there to Dakar.

The New Commercial Aviation Programme in France

The Directorate of Aerial Navigation, under Col. Sacconney, has been instructed to draw up an aerial map showing the series of international air routes which it is proposed to organize.

The following are the principal routes:—Paris-Abbeville for London, Paris-Tours-Angoulême-Bordeaux and Bayonne for Spain, Paris-Valenciennes for Brussels, Paris-Strasbourg for Central Europe, Paris-Dijon-Lyon-Avignon-Marseille and the Balaeric Islands for Algiers, Paris-Dijon-Lyon-Avignon-Marseille-Nice-Corsica for Tunis. Among the routes already in operation, the Bordeaux-Toulouse will shortly be extended to Nimes, from whence a service will extend to Marseilles and Nice.

New lines will be opened up as soon as possible which will link up the Antibes, Corsica, Sardinia and Tunis (by seaplane), Marseille-Algiers *via* the Balaeric Islands, Bayonne-Santander, and trans-Casablanca.

The aerial routes in North Africa will, as at present, remain under military control. It is proposed to establish a coast line running through Tunis, Algeria and Morocco, and another line 250 miles inland parallel with the coast and linked to the coast line by inter-connecting routes starting from Tunis, Algiers, Oran and Casablanca.

Commercial Aviation in South Africa

The Air Ministry is informed by the Acting High Commissioner for South Africa that the Government of the Union desires to offer every encouragement to the development of commercial aviation in the Union of South Africa.

The Government of the Union proposes, if possible, soon to introduce legislation which, in connection with the proposed revision of the Customs' Tariff, will, it is hoped, give material aid with reference to aeroplanes of British manufacture.

Another Expedition by the Royal Air Force

Aeroplanes took part successfully in an expedition to the Nasser country, organized by the Sudan Government recently against the Nuers in the Baro district. A large hostile party which could not be dispersed by other means was satisfactorily routed by the aeroplanes. The expedition is still operating and the work is greatly facilitated by the assistance of the R. A. F.

Calcutta-Bombay Flight

A Handley Page aeroplane, flying from Calcutta and carrying three press representatives, three passengers, one pilot, Captain Clarke, two mechanics, and one servant, arrived at Bombay recently having accomplished the 1,200 miles flight in 17 hours' actual flying.

Makes Record in Paris-Lyons Flight

Paris—Henri Roget, a widely known aviator, has established a record by flying from Paris to Lyons in 1 hour and 50 minutes, his speed being estimated at 147 miles per hour.

A New Aerial Transport Service Between France and Spain

A branch of the Société Anonyme de Transport Aéronautiques du Sud-Ouest de la France is being organized at Bilbao, for the conveyance of goods and passengers between Bilbao, San Sebastian, Biarritz and Bayonne. The fare for passengers will be about 150 pesetas each.

Aerial Mail Service in Belgian Congo

The first seaplane flight on the Belgian Kinchasa-Stanleyville aerial mail and passenger route took place on March 8th. A seaplane of Levy-le-Peu type flew from Kinshasa to Bolombo, a distance of 200 miles, in 2 hours 39 minutes.

Aerial Tours in England

The Central Aircraft Company of London have issued a folder giving particulars of the flights that can be made from their aerodrome at Northolt, which it may be mentioned is readily accessible, being within a few minutes' walk of Northolt Junction, or about half an hour by car from London.

Already the "Flight over London" has become most popular, 18 passengers having been carried the first week, and advanced bookings for the "Thames Valley Flight," "Tours around Kent," and "The Cathedral Cities from the Air" prove that these are likely to become equally popular during the spring and summer. Prices vary from £1 2s. 6d. for a short flight over the surrounding country to £40 for a tour around South Wales, about seven hours' flying, or £60 for a three days' tour of the battlefields. The above-mentioned tours are some of the standarrd ones, but any tour can be arranged to suit the wishes of clients.

Japanese Mission on a Visit to England

It is reported that General Nagaoka has arrived in England to study British aeroplanes and their manufacture.

Germans Build Aircraft Larger Than Zeppelins

Geneva.—The Germans are working to construct giant commercial and passenger airships and aeroplanes. The first trials were successfully held of two monster machines above Lake Constance.

The airship Nordstern, greatly surpassing the Zeppelin Bodensee in size, capacity and power, flew for half an hour around the lake with a crew of seven men. At the same time a new giant hydro-aeroplane, whose motors totalled 1,000 horsepower, made flights with twenty passengers. Both machines were completed recently at Friedrichshaven.

A New French Committee

The Under-Secretary of State for Aerial Transport has decided to form a consultative committee on aeronautics which will embrace all technicalities concerning the development of aeronautics, including aerodynamic research, technical instruction, aerial navigation, inventions, the maintenance of a technical library, etc.

The committee will be presided over by M. Fontan, the Director of the S.T.Ae., who will be assisted by Commandant Robert, who is in charge of the Research Section of the S.T.Ae., and Captain Camerman. The other members of the committee will be appointed as follows: Four scientists by the Under-Secretary of State, two engineers or constructors by the Aero Club de France, and four engineers or constructors by the Chambre Syndicale des Industries Aeronautiques.

Establish New Dutch Aerodromes

Military aerodromes have been established in Holland at Soesterberg, N.E. of Utrecht, and Schiphol, S.W. of Amsterdam, and three maritime aerodromes, two for seaplanes at Schellingswoode, E. of Amsterdam, and at De Molk, on the Isle of Texel, and one for land machines at De Koot, S.E. of Helder. There are civilian aerodromes at Ede, near Arnheim, and Maaldrift, N.E. of The Hague.

Bristol "Pulman" Tests

According to reports the new Bristol "Pulman" on test has shown a full power speed of 134 m.p.h. at 2,000 ft.

This, if confirmed, makes this aeroplane the fastest large aeroplane yet constructed. It will be remembered that the Bristol "Pulman" is a modified version of the Bristol "Braemar" triplane, fitted with a totally enclosed cabin for 14 passengers, and is engined with four "Liberty" engines each of 400 h.p.

Paris to Prague with One Stop

M. Douchy, with a Potez S.E.A. biplane, fitted with a Lorraine Diétrich engine, flew from Paris to Prague with one stop to replenish the tanks. The flight of 1,000 kilometres lasted five hours twenty minutes.

A New De Pischoff in France

M. De Pischoff is building a "sport" plane, an "Aironnette", fitted with a Clerget engine of 16 h.p. The plane will weigh 95 kilogs in flying order, and will fly at 100 kilometres per hour, its landing speed being 40 kilometres.

Aerial Service Between Paris and Warsaw

A regular weekly aerial service is now working between Paris and Warsaw. The American pilot, Captain Veil, is at the head of the undertaking, which has been organized by the Messageries Aériennes. Breguet machines are used. Intermediary landings are made at Coblentz and Berlin.

Mr. Holt Thomas Resigns from Airco

The resignation of Mr. C. Holt Thomas from the chairmanship of the Aircraft Manufacturing Co., Ltd., of England, was announced on March 20th last. Mr. Holt explained his action was due to the laxity and failure of the British government to provide sufficient encouragement for the continuation of aviation experiments and the support of civil aeronautics.

A Zeppelin Flying Boat in Holland

A Zeppelin flying boat has arrived near Amsterdam from Friedrichshafen for a series of demonstrations. The flying boat made a trip above the North Sea, coming down frequently to the water.

A feature of the boat is that it is built entirely of aluminum, except the wings, which are covered with fabric. It is 43 ft. long, weighs 55 cwt., and is fitted with two 250 h.p. motors, giving the machine a speed of 109 miles. The cabin holds six passengers.

An Airship Service to Norway

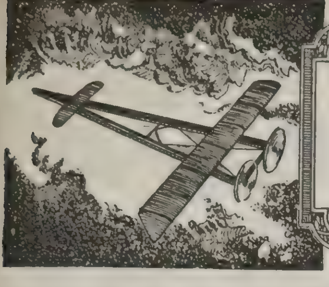
Recently the three rigid airships, R-32, R-33 and R-34 cruised from Pulham to Howden aerodrome, Hull, which it is hoped will become the starting-point of a commercial airship service to Scandinavia and Holland. The R-32—a modified form of the R-31—is a wooden-framed airship, built by Messrs. Short Brothers, and is equipped with five engines, each of 300 h.p., as against the same number of engines of 275 h.p. each in the R-33 and R-34. The R-33, it may be recalled, was built by Messrs. Armstrong, Whitworth, Ltd., and the R-34 by Messrs. Beardmore, on the Clyde.

Fast Flying in Italy

Some fast journeys have recently been made by the 750 h.p. Fiat-engined A.R.F. biplane, piloted by Lieut. Brack-Papa. It covered the 388 miles from Rome to Turin in 2 hours 15 mins., averaging 172 m.p.h. The machine carried two passengers, one being Gabriel d'Annunzio. On the 22nd it flew the 155 miles from Rome to Naples in 47 mins. Again two passengers were carried.

French and Aviation in Argentina

General Pétavy and Prince Murat, representing certain French companies, have conferred with the Argentine Minister of Public Works as to the possibility of establishing new industries and air services in the Republic.



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon

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Sedgwick & Division Streets, Chicago, Ill.

Caproni Biplane Model

IN the March 29th issue of AERIAL AGE I showed the construction of a Handley Page which was received with enthusiasm by the readers and, because of the fact that the Caproni was another of the large European aeroplanes experimented with in this country and many were used in the late war.

The Caproni has many interesting features about it that are of note and for experimental purposes or for scale model building of the flying type. Mr. Caproni, the inventor of this machine, is now in this country on a tour and predicts machines of many motors carrying great weights that will travel from America to Europe and back regularly.

Should the reader have any trouble getting correct dimensions from this small drawing or if he should prefer to work from a blue print, I might state that the Wading River Mfg. Co., whose address can be found in the advertising columns, sells plans of a Caproni biplane for a small amount of money as well as any parts used in its construction.

Fuselages

The first units to be assembled are the fuselages. You will note that there are two fuselages on each side and a nacelle in the center. The fuselages are built up of ⅛" spruce throughout. The longerons are drilled with a No. 60 drill wherever the body struts are placed and some glue placed between the strut and the longeron, after which a nail is driven through the longeron into the struts. The motor stick, a piece of spruce 1/4 x 5/16" and 12" long is fastened to the upper longerons. On account of the motor stick being so short, it might be well to use a geared propeller hanger to increase the number of revolutions of the propellers.

The fuselages are then covered over with fibre paper or thin silk if not too expensive and doped with aeroplane varnish.

Nacelle

The nacelle is constructed like the fuselages from ⅛" spruce, and after inserting the motor stick is covered and doped.

Main Plane

The construction of the main planes is clearly shown and if possible should be made in one piece. The ribs are of the solid type which are cut out of wood 1/16" thick to some good wing section. (Some U. S. A. curves were given in a recent issue of this paper.) Holes are drilled for the wing spars which are dowels ⅛" in diameter and are inserted in the holes and the ribs pushed along the spars to their proper places and glued in place. The reed edging is then glued to the tips of the wings as shown. The covering is put on last and doped.

The bottom wing differs from the upper slightly inasmuch as the ribs where the bodies rest are eliminated, to allow the body to rest squarely on the wing spars.

The interplane struts are made of spruce and streamlined. The ends are inserted into sockets that are nailed to the spars.

Tail and Rudder

The tail is made in one piece as shown. The main spar that runs through the center is ⅛" in diameter and the ribs are streamlined. A hole is drilled for the spar which is inserted in the hole. Then the ribs are placed in position and glued. The edging is 3/32" reed. The rudder is constructed the same. The two are then covered and doped.

To assemble the model place the interplane struts in position and brace, with wire as shown, then place the nacelle and fuselages in place over the lower wing and fasten firm. Next fasten the tail to the rear end of the fuselages and then place the three rudders in position.

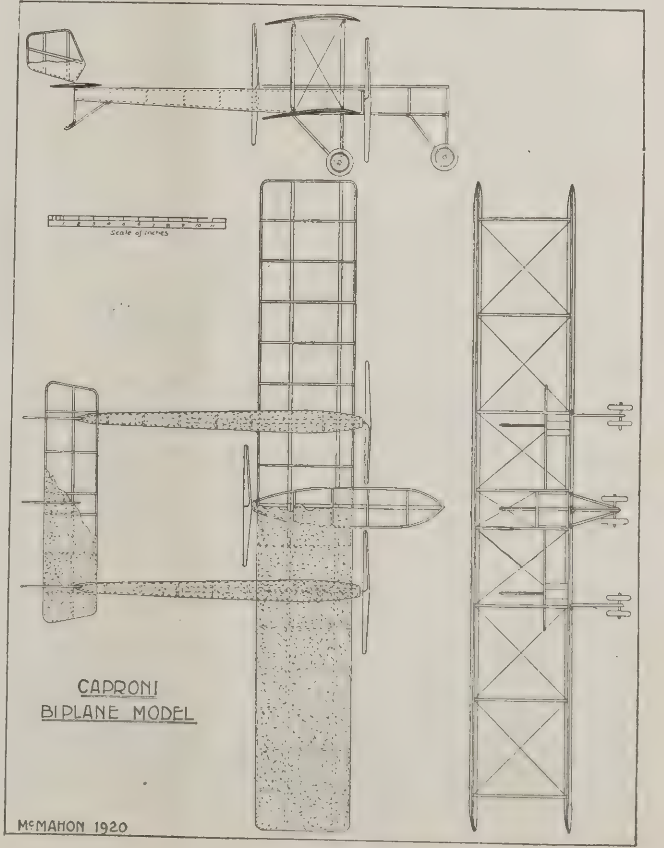
In the forward noce of the nacelle fasten a tripod made of 3/32 or ⅛" reed to the lower longerons at the extreme nose and back about 3". To the lower part or apex of the "V" fasten an axle and two 2" wheels.

Two more landing chassis "V's" and wheels are fastened to the lower plane immediately underneath the struts that come alongside of the fuselages. Should the reader wish dimensions he will find a scale of inches in the drawing. To use it simply find the length of the part in the drawing, then place the measurement on the scale and read the length it should be in inches.

Wading River Mfg. Co. New Catalog

The Wading River Mfg. Co., dealers in model aeroplane supplies and complete models of every type, announce their new catalog for 1920-1921 which is complete in every way.

It would be well for those who build scale or flying models to write for this catalog which they offer for the sum of five cents.



CAPRONI BIPLANE MODEL

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Gabriel Correspondence School

(Lesson 3)

We will assume that from our first lessons you have learned to distinguish an aeroplane from a ferryboat; know how to get into the cockpit; can move the levers back and forth; know where the dials are, and can tell the gasoline tank from the joy-stick.

When ready to fly, take your plane to a long field. Remove all trees, telegraph poles, baby carriages, carpet tacks or other obstructions, and place them carefully to one side. Line your plane up lengthwise with the field and get ready to go.

There are some very good pilots who are particular about the direction of the wind. Don't let that worry you. If you take off with the wind you can go twice as fast; if you take off against the wind you will be a flier that much sooner, because you leave the ground twice as quickly. Be careful, however, not to take off with the wind from a field shorter than twice the length of the ship.

Don't do a tight spiral around a church tower in a fifty-mile wind. Winds vary in strength. Some wouldn't disarrange the motes in a sunbeam and others would pull pin-feathers out of a rhinoceros' hide. When the wind is so stiff that you land moving backward, it's "some wind." But wind is a subject by itself, and we hope sometime to teach you how to forecast weather conditions from the simple cirrus, curious stratus or clumsy-nebulous cloud forms.

Having scrambled gracefully into the cockpit, start the engine according to the approved method prescribed in Lesson 2. Pull your goggles down to your shin, grasp the stick tightly with both hands and give 'er the gun. Never take an instructor with you on your first ride. He might become nervous and freeze the controls.

As you speed forward across the field you don't have much to watch. If the rudder is too much to one side you do a ground loop; or if you push the stick too far forward you make a somersault. If you pull the stick too far back you start on a loop but never finish it—the ground is built too close to the sky. If the stick is too far to one side as you take off you do a side-slip or a wing-pivot. So you have nothing to worry about.

When you think you have gone far enough on the ground, push your stick forward and get "your tail" in the air. As long as your tail is on the ground you can't get much altitude —unless you have a very long tail. Now gradually pull the stick toward you and you will "take off."

The beginner finds difficulty in ascertaining the exact moment at which he leaves the ground. To determine this, unfasten your safety belt, lean far out over the side and watch the wheels.

As you leave the ground, wave at least one hand in the air. This shows your carefree, nonchalant manner; your sufficiency of ability and your freedom from uncertainty.

Now that you are safely in the air, if the altitude doesn't affect your ears or your heart, we will leave you there until next lesson. Then we will teach you how to land.

P. S.—In the meantime fly straight ahead and conserve your gasoline supply. You may need it if the next lesson is late.

—Courtesy Pacific Aeronautics.

An Aviator's Description of a Fair Damsel at a Dancing Party

She was some 5 feet 4 inches OVERALL LENGTH, TRACTOR TYPE, designed somewhat after the Mary Pickford model; faultlessly STREAMLINED and her features were slightly radical in design, but she showed a very good ASPECT RATIO.

The ENTERING EDGE of her chin had a very noticeable PHILLIPS ENTRY. Her nose took the place of a well-designed FIN, with deeply CAMBERED eyebrows. Upon VETTING her ears she showed a two-degree DIHEDRAL, and the NEGATIVE WASHOUT in the corners of her mouth gave a DERNIERE TOUCHE to her bewitching features. Her complexion at a distance was so CAMOUFLAGED as to give her the appearance of a school girl. Her hair was SWEPT BACK, giving the effect of HIGH INHERENT STABILITY with a solid gold CABANE having very little BRACING. Her shoulders would indicate a large KATHEDRAL. She being of TRACTOR TYPE, her FUSELAGE was carefully covered with the finest quality FABRIC and her LONGERONS so designed as to give exquisite effect.

She had a stately and well sprung UNDERCARRIAGE, and as she TAXIED about the floor her graceful TAKE-OFF was very noticeable, although she had a slight DUTCH ROLL and a very peculiar PITCHING MOTION at first, but she quickly assumed her PROPER POSITION.

One of the PILOTS reports she was so perfectly ALIGNED that she responded very quickly to the CONTROLS, especially in a SPIN, and she readily assumed her GLIDING ANGLE.

In an attempt to test her CONTROLS, together with her RESISTANCE, the CRITICAL ANGLE was found and she started to STALL, giving the observer a beautiful example of HANDS OFF, which immediately showed sufficient FACTOR OF SAFETY.

Owing to a sudden RETREAT a large GAP must be left in the details of description, which leads us to suspect a WARPED disposition.—From *Wings,* Official Organ of the Cleveland Aviation Club.

Astonishing the Natives

By
William Harnden Foster

After giving a few spectators a fine exhibition of flying, we finished with a stunt that electrified the crowd

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GALLAUDET
LIBERTY TOURIST
FOUR PASSENGER

For Pleasure and Commercial Flying
Standardized Parts

General Characteristics:

Spread	44′
Length overall	29′5″
Chord	7′
Gap	6′6″
Stagger	13″
Height	10′9″
Dihedral	1½°
Angle of incidence	2°

12-cylinder, 400 h.p. Liberty Motor, speed 125 miles per hour. Landing speed 45 to 48 m.p.h. Weight, including passenger load (4) and equipment, 3,800 lbs.

Seating Capacity:

Designed primarily to seat four persons, two in the forward cockpit and two in the rear; there is really room for five.

The forward cockpit which is directly over the centre of balance, will seat the fifth person without disturbing the equilibrium of the machine.

Luxurious leather upholstery prevails throughout.

For full and complete details of this modern flyer address

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WE have opened an aircraft department under the management of Edward A. Kelly, who has had eight years' experience as pilot and instructor; over three years' war service. It is very necessary that you place your insurance with one who understands your need and can give you prompt service with minimum rates and in case of accident can look after your claim. We are in a position to write insurance covering fire from all causes. Collision with the earth or any object, stranding or sinking, tornado, cyclone or windstorm, damage from demonstrating, passenger carrying, instruction or acrobatics.

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Send us your insurance troubles.

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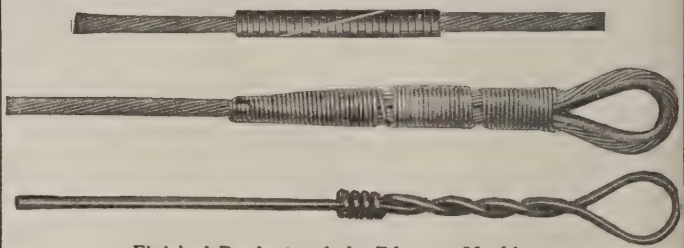
Edstrom Machinery Company
WAR DEPARTMENT
BUREAU OF AIRCRAFT PRODUCTION
AIRPLANE ENGINEERING DEPARTMENT
McCook Field, Dayton, Ohio, U. S. A.
REPORT Serial No. 646
on test of cable terminal connections made on the Edstrom Wire Wrapping Machine.



Finished Products of the Edstrom Machines

". . . It is to be noted that out of ten unsoldered specimens sizes ⅛" to 5/32", only one failed at a load below the rated capacity of the cable. The 3/16" specimens served with copper wire failed at loads averaging 71% of the full strength of the cable."

NOTE: The nine cables standing 100% were wrapped with the special strength wrapping wire we use on all our work.

". . . The Edstrom Wire Wrapping Machine . . . should be given a trial where such a machine is desired."

We can give you stronger, neater and better work at a great saving of cost to you.

Let us give you our price

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LONG ISLAND CITY, NEW YORK

Civilian Foresters Making Progress in Observation Course

The class of twenty forest rangers taking the course of instruction at March Field are making rapid progress in their work. Radio instruction has not yet passed beyond the sending and receiving stage.

The theoretical course in map reading and sketching has been completed and the class is now engaged in making flat road sketches of the country surrounding March Field. They will next make contour road sketches and the course will be completed by a combined position sketch made by the entire class.

In their aeroplane course, a short course in aerodynamics was given, not so much for the practical value as for the increase of general knowledge of the problems faced by the designer, manufacturer and pilot. The subject of landing fields was covered, taking up the selection, size, preparation, marking and requisite qualifications for landing fields.

It is planned to have lectures of a similar nature given to pilots by the Forest Supervisors, so that the pilots may become acquainted with the problems of the Forestry Service, thus insuring closer co-operation between the two services in the coming fire patrol season. The rangers are receiving short flights during which they sketch from the air, learn to locate landmarks from the maps, and spot fires according to co-ordinates.

Aviation Club of Chicago Holds Election

Chicago.—The annual election of officers of the Aviation Club of Chicago was held here recently.

The club now has seven hundred members on its roster, and is but two years old.

Aviation is taking on new life in Chicago, and all the great mid-West country, and much of this interest is traceable to the enthusiasm engendered at the Chicago Club meetings.

The officers elected are: Sheldon Clark, president; Bion J. Arnold, H. H. Merick, D. F. Kelly, vice-presidents; John Fletcher, treasurer; J. W. O'Leary, W. Rufus Abbott, Arthur Cable, Maj. E. L. Ryerson, Laurence Wilder, B. M. Winston and Maj. James A. Keating were elected directors.

Enlisted Men to Pilot Planes

For the first time in the history of the aviation repair depot at the Speedway, Indianapolis, Ind., enlisted men will be assigned to pilot planes on recruiting flights. Maj. Jacob Rudolph, commanding officer at the Speedway, expects that as soon as the landing fields were in suitable condition two aeroplanes will be sent to Chicago for recruiting purposes, piloted by Sergt. (first class) Truello and Sergt. (first class) Mills.

About 100 aeroplanes of all types will be sent here for repair, and 300 or more motors. In addition to repairing planes and motors of the army air service, the depot will also have the work of repairing the planes of the Post Office Department, used in the carrying of aerial mail.

Book Reviews

THE STORY OF THE GREAT WAR. *By William S. Braithwaite.*

The complete story of the Great War told so clearly and so vividly that the reader will grasp at once not only the big facts of every battle and campaign but will understand the underlying meanings of the world struggle.

The book outlines with broad insight the causes leading up to the war and the history of every nation's share in the conflict. In easily understood terms it tells of the war from the diplomatic, political and military viewpoint, gives the history of the embattled navies, the aeroplanes and submarines, of chemical warfare, and indicates the food situation and economic conditions in the warring countries.

This book can be purchased at the Aeronautic Library, Inc., 299 Madison Avenue, New York City. Price postpaid $3.30.

HANDBOOK OF MODERN AERONAUTICS. *By Arthur W. Judge.*

This is a complete and up-to-the-moment compendium of information about aeronautics for those who are interested in its practice and theory. No pains have been spared to verify all the entries, most of them having been tested by the author. References and bibliographies at the end of each section further enhance the utility of the book, enabling the user to obtain quickly any fuller information he may urgently need. The work contains 1040 pages, 345 illustrations and 350 tables.

It is a handy book of reference for the use of engineers, designers, draughtsmen, manufacturers, the works' staff, the student, and all interested in aeronautical theory and practice. Price postpaid $8.00.

This book can be purchased at the Aeronautic Library, Inc., 299 Madison Avenue, New York City.

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WEEKLY

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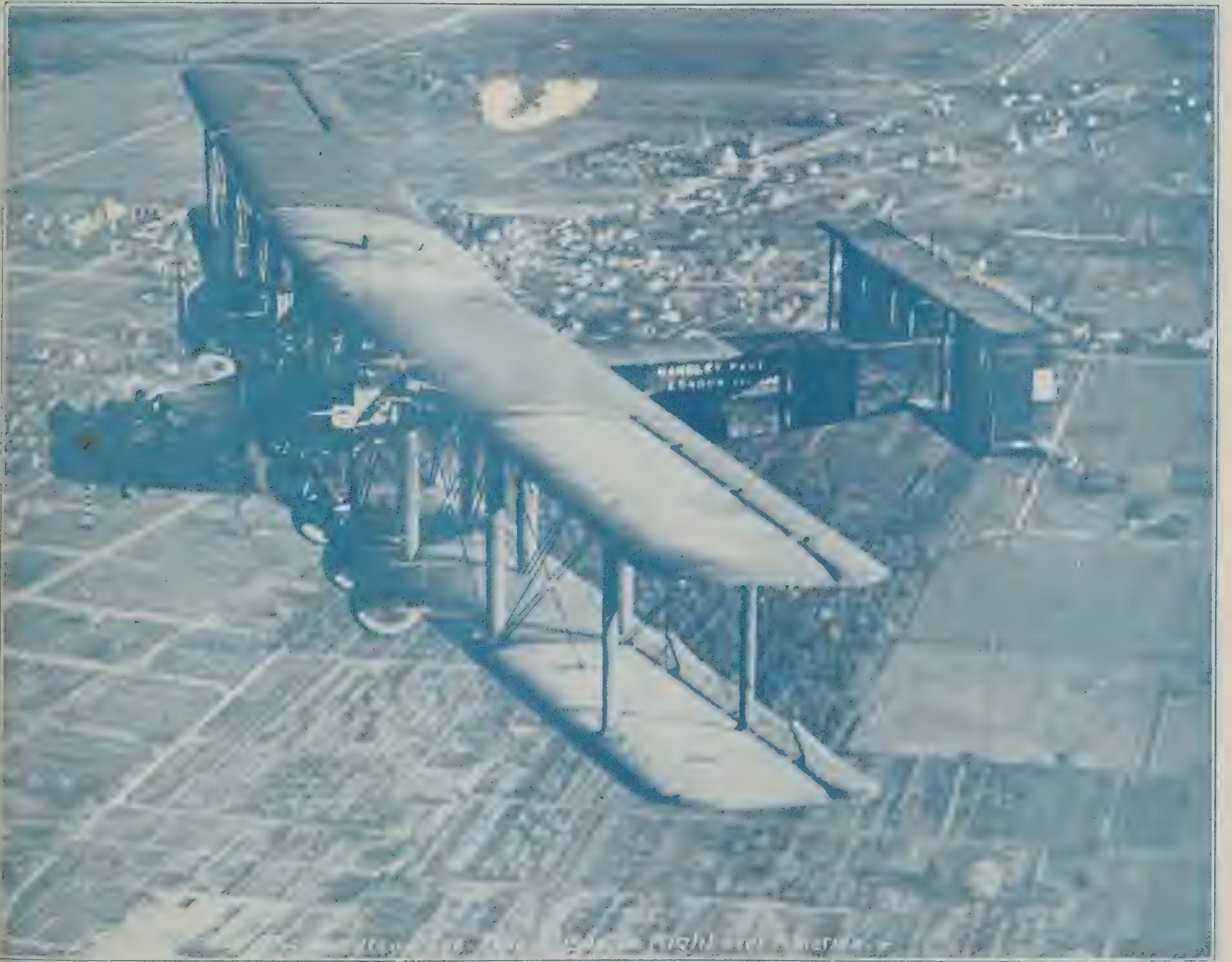

The Four-Motored Handley-Page Cruiser Over Long Island

U. S. Attorney General Requested by Congress to Recover Funds Fraudulently or Illegally Paid to Constructors

ISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
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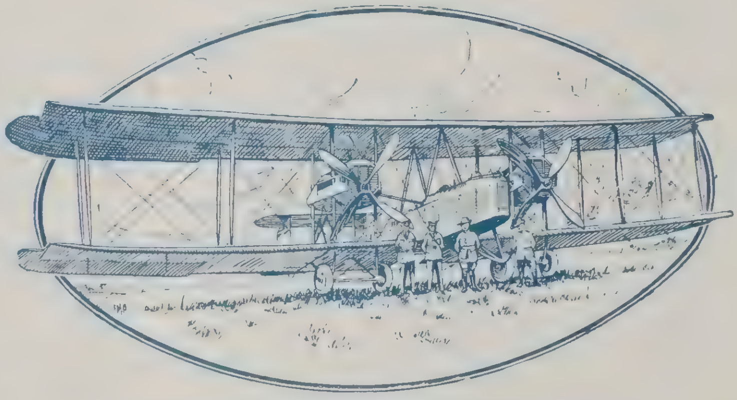

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THE WORLD'S LONGEST NON-STOP AEROPLANE FLIGHT

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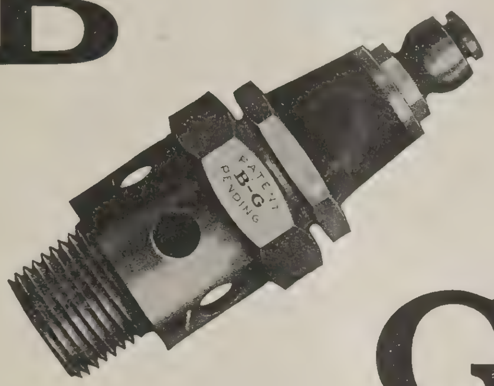

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On the compression stroke of the piston pressure is accumulated in the body of the plug in the space provided above the sparking points. The explosive mixture enters the chambers through four holes drilled at an angle through the base of the plug and the opening around the center electrode, scavenging the points in passing. Such oil as may find its way through these holes is caught in an oil pocket immediately above them, the pure mixture passing into the compression chamber of the plug.

On the power stroke of the piston the accumulated oil and pressure escape through the holes. The pure mixture passes out at great pressure, being deflected against the sparking points in leaving the chamber, thereby keeping the points clean.

Write for descriptive circular of B. G. Plugs, Installation chart, together with prices and record of achievements.

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33 Gold Street New York City, U. S. A.

AERIAL AGE
WEEKLY

VOL. XI APRIL 26, 1920 NO. 7

TABLE OF CONTENTS

PAGE

U. S. Attorney General Requested By Congress to Recover Funds Fraudulently or Illegally Paid to Constructors 213

Attorney General Asked to Investigate Manufacturers Aircraft Association 214

The News of the Week 215

The Aircraft Trade Review 217

U. S. Aerial Mail 218

Sopwith Commercial and Sporting Types 219

The 12-Cylinder 800-900 H.P. Sunbeam-Coatalen Aircraft Engine . . 221

Report on Aircraft Surveys 221

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures 226

Naval and Military Aeronautics . . . 227

Foreign News 228

Elementary Aeronautics and Model Notes 229

Aeronitis 230

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Curtiss

The Seagull Always Comes Home

Worries spoil pleasure.

When you start out on an automobile trip, you always enjoy yourself most when you have confidence in your car.

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When you leave your home in the morning—for a 500 mile aerial cruise—you don't want to be bothered about what might happen.

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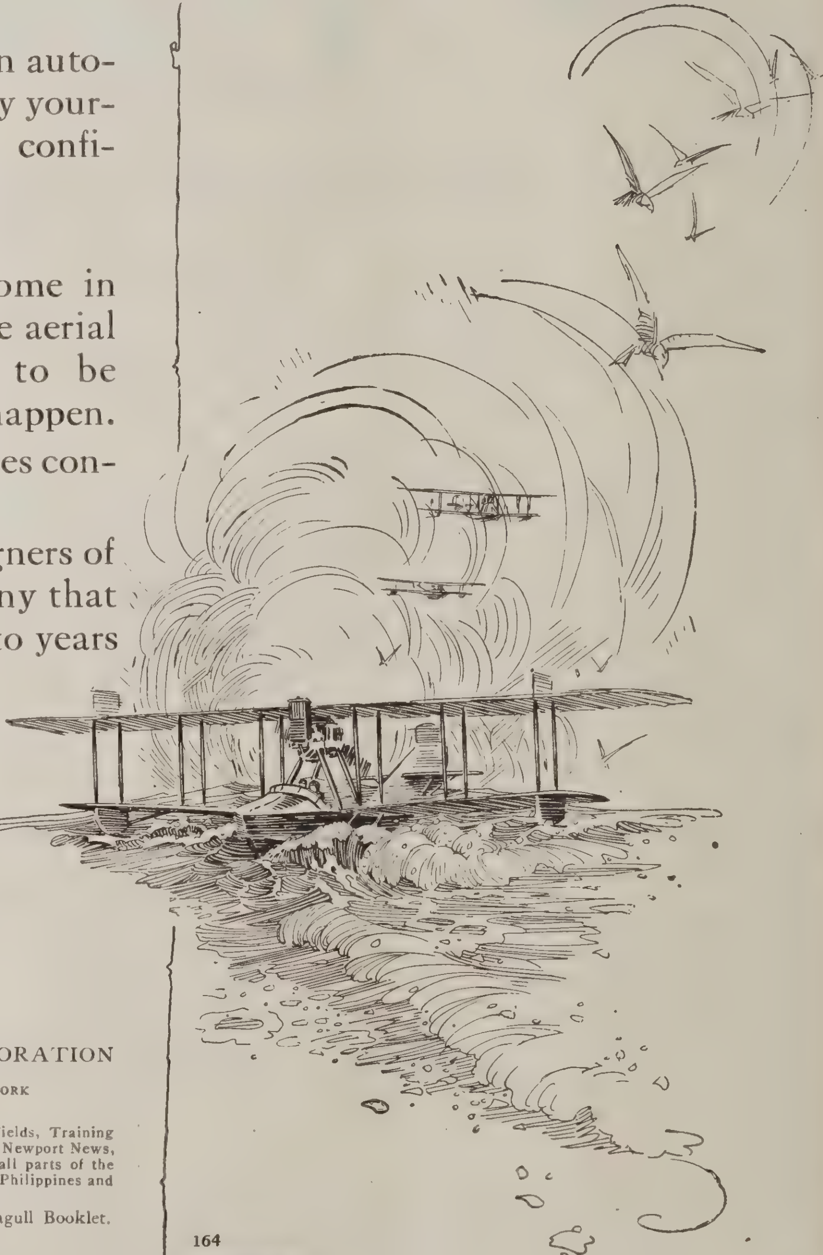
164



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U. S. ATTORNEY GENERAL REQUESTED BY CONGRESS TO RECOVER FUNDS FRAUDULENTLY OR ILLEGALLY PAID TO CONSTRUCTORS

BY resolution of the House of Representatives the Attorney-General is requested to **"institute investigations before grand juries for the purpose of indicting and prosecuting such persons as are guilty of criminal conduct, and to institute civil suits for the recovery of any Government funds which have been fraudulently or illegally paid on account of such emergency construction work."**

In the discussion that preceded the introduction of this resolution Congressman Fess made a statement showing clearly that matters pertaining to the aircraft program are to be submitted to the Attorney General. His statements, which are printed in the *Congressional Record* for April 12, read in part as follows:

> We started the investigation of these expenditures soon after the Republican Congress met. This was done in answer to a general demand from the people. Why? First, the people have a right to know how the money that they are paying in the form of taxation was and is being expended. No amount of boasting by Democratic politicians of what was done will answer that demand. Secondly, there is an inherent right in this Government to find the culpable party who takes advantage of his Government in time of war. **If there has been anyone guilty of moral turpitude, taking advantage of the war to profiteer at the expense of this Government, then we have a right not only to point it out, but we must prosecute the men who have done it. [Applause on the Republican side.] People from every section of this country are demanding prosecution. Congress can not do that. That is the work of the Justice Department. Congress can uncover the facts. It is so doing. The Justice Department must prosecute.**
>
> It is generally believed that there will be no prosecutions. That an administration will not find itself guilty. There is a basis for this statement.
>
> In the investigations thus far there was a report from the special commission upon aircraft, appointed by the President in response to the general outcry of the Nation for the actual situation. That report was made by Justice Hughes, whose commission was confined to finding facts. It made recommendations which were indorsed by the Attorney General of the present administration. The report was sent to the Secretary of War with the recommendation that certain specific men therein named be court-martialed, which recommendation was based on the facts submitted. In spite of the facts and recommendation, the Secretary of War decided that it was not a sufficient case to submit for court-martial proceedings, although we had spent $1,055,000,000 for aircraft and had not a single American-built battleplane at the front, and only 196 other American-built planes, yet we were told that there was no ground for court-martial procedure. This action of the War Department indicates what is to be expected from the administration in the prosecution of such cases. Congress can not go further than make the investigation. **The Department of Justice, which, in the aircraft case, indorsed the Hughes recommendation, must necessarily make the prosecution when brought under the civil authority. The indictments secured by the Shipping Boards investigations show what can be done. Another reason why we must uncover these irresponsible expenditures is to compel a repayment wherever it can be shown that funds have been collected under false contracts or where advantage has been taken of the Government. There are numerous cases of this sort already promised.**
>
> Still another reason why we must continue to make the investigation is to lay the foundation to cut off the unnecessary and continuing war agencies that still persist. We are bitterly assailed by the country because we have not been able to separate all the thousands of war workers who are still on the pay roll and who are employing every influence to continue on it. If you do not lay this foundation, we will not succeed in our efforts to get back to normal, and we are subject in Congress to the criticism that we are maintaining these war agencies. [Applause on the Republican side.] Our business here is not in any way to discredit men nor an administration because they do not happen to be on our side politically, but our business is to know how the money was spent, to let the public know it, **to prosecute where there is guilt, to recover where there is fraud, and to lay the foundation to cure the disease that the whole Nation to-day is still suffering from.** What has already been accomplished justifies us in an expectation that more will still be done. That is why I will vote for the rule. Our duty as Congressmen is to get at the facts. It is then up to the Department of Justice to prosecute the guilty parties. Indictments have already been secured in some cases and trials are awaited. If, as in the aircraft cases, the findings of a presidential commission are ignored, the only recourse left us is an appeal to the people, which will not be long deferred. [Applause on the Republican side.]

The SPEAKER. Under the rule the previous question is considered as ordered, and the question now is on agreeing to the resolution.

Mr. POU. On that, Mr. Speaker, I demand the yeas and nays.

The yeas and nays were ordered.

The question was taken; and there were—yeas 154, nays 113, answered "present" 2, not voting 159.

ATTORNEY GENERAL ASKED TO INVESTIGATE MANUFACTURERS AIRCRAFT ASSOCIATION

THE following copy of a letter written by Mr. William Whitney Christmas to Attorney-General Palmer has been received by AERIAL AGE with a request that it be published:

New York, April 15, 1920.

HON. MITCHELL PALMER,
Attorney General of the United States,
Washington, D. C.

SIR.—Your attention is called to the Memphis Court decision, rendered in the Hardwood Lumber case, with reference to its effect upon the so-called "Aircraft Trust", represented by the Manufacturers' Aircraft Association, which, as you know, was condemned by the U. S. Senate as "vicious" and "designed to reap large profits by taking advantage of the Government."

The reports of the investigations conducted by the House of Representatives and the Senate show that Congress appropriated over two billion ($2,000,000,000) dollars for Army and Navy aeronautic appropriations during the past three years, and over half of it was actually expended for aeroplanes, motors, dirigibles, kite balloons and other aeronautic equipment, very little of which was sent overseas, and that, according to the recent report of the House of Representatives "Select Committee on Expenditures in the War Department", a great portion of this money was spent in contracts placed with a few manufacturers who are members of the Manufacturers' Aircraft Association, essentially because the Association's "paid lobbyists" took advantage of busy Government officials and by various methods condemned as "vicious" by the Senate Investigating Committee, obtained millions of dollars of public money.

This fact having been established by the Congressional investigations and by the Hughes' investigation, we find this one preposterous situation, which you as Attorney General will no doubt find it necessary to investigate:

(1) The American public will have to pay over $50,000,000 a year in taxes, (figured at the present Liberty Bond rates), as interest on the enormous aircraft expenditures, which amounted to over $1,000,000,000 on June 30th, 1919, and will be more before all the war contracts are liquidated.

(2) The Hardwood Lumber Trust, whose methods were mild compared with the Manufacturers' Aircraft Association's methods, has been duly prosecuted for the comparatively light offense of having exchanged trade information, while the Manufacturers' Aircraft Association, according to the evidence in the hands of Congress, and as shown by the Congressional hearings, is still carrying on its pernicious lobbying, trying to get more Government subsidies, and still indulging openly in the practice which the Senate condemned as "vicious", and is evidently more destructive than what is known as "trade restraint" because it includes trade conspiracy and profiteering of the worst kind.

(3) The Manufacturers' Aircraft Association has escaped direct investigation because it was not within the scope of either the Senate Aircraft Investigating Committee or the Hughes Investigation or the House of Representatives' Select Committee on Expenditures in the War Department. The scope of all these investigations was essentially to ascertain whether there had been waste in the various Government departments and whether there had been criminal violation of the statutes.

No investigation has as yet been conducted to ascertain the extent of profiteering and possible criminal practice on its part or on the part of individual members of the Association.

We submit that it is plainly the duty of the Attorney General to conduct this important investigation which will probably result in saving millions of dollars to the United States, and, possibly, also result in forcing the return of millions of dollars obtained by the Manufacturers' Aircraft Association and its members from the Army and Navy by methods which have been condemned by Congress.

These evils were so evident that the Senate Committee found itself obliged to mention the situation in its report.

The Senate Committee's statement was as follows:

> "Although this subject has been referred to a special sub-committee for investigation, it has constantly obtruded itself upon our attention hence we cannot avoid referring to it.
>
> "The National Advisory Committee of Aeronautics, confronted with the necessity of satisfying the claims of patentees and avoiding possible delays threatened by conflicting patent rights, determined upon mature consideration to settle these difficulties through the agency of a Manufacturer's Aircraft Corporation, to be composed of those engaged in the industry and empowered to license all aircraft contractors, who should pay a royalty to the company upon all planes and parts to be constructed and to assign to the company for the common use all patents or applications therefor owned or controlled by the licensees. The bulk of these royalties was to be paid to the Curtiss and the Wright-Martin Cos. as compensation for the use of certain patents until each had received $2,000,000. These were to be charged against cost of production and paid by the Government. The agreement was sanctioned by the Department of Justice and approved by the Secretaries of War and the Navy.
>
> "The committee has not heard a word in approval of it. It is condemned by every airplane manufacturer outside of the immediate beneficiaries. Those executing the license agreements have done so under protest because the Aircraft Board recommended or required it.
>
> "Criticisms of it are numerous, the most serious of them being that it subjects manufacturers to onerous requirements by its beneficiaries, such as assessments for the use of plans and specifications, the purchase of the material and accessories from favored houses, the assignment and surrender of valuable patents and patentable devices to the Aircraft Association upon terms prescribed by itself, the discouragement of invention, and the inevitable control of the aircraft industry by that association or by some other interest through its agency. Your committee sympathizes with many of these sentiments, and notwithstanding the Aircraft Production Board as now officered no longer requires or recommends the execution of the agreements by contractors, We believe the arrangement should be abrogated. We regard it as vicious and as designed to reap large profits by taking advantage of the necessities of the Government. The basic patentees should, of course, if the patents are valid, be compensated, but this should be done by the Government directly whenever the courts finally determine who the owners are and the patents should then be made free to all manufacturers.
>
> "New patents of meritorious character should be similarly acquired by the Government as they appear. Such a course would stimulate invention and promote the development of an art which is still in its cradle.
>
> "This is not a new departure but rather a reversion to an earlier policy, for Congress in 1917 appropriated $1,000,000 for the purchase of aircraft patents, which sum is still available, and if insufficient for the purpose it can be easily increased. The Government should never be made the victim of a patent monopoly which it generously created for the sole protection of the inventor against infringement by persons and corporations."

By looking into the situation referred to in the last paragraphs of the Senate report you find an extraordinary situation. Congress had appropriated $1,000,000 to buy the aeronautic patents. These patents were not bought and the million dollars is still in the U. S. Treasury. But the sum of over $2,000,000 was paid by the Army and Navy to the Manufacturers' Aircraft Association for the temporary use of two patents which Great Britain bought outright for only $95,000.

And both the Army and Navy and the Post Office must still pay royalties on aeroplanes which they order for the use of these patents for which over $2,000,000 has already been paid but which Great Britain bought outright!

The Act of Congress of 1917, which provided for the purchase of aero patents, read as follows:

> "To enable the Secretary of War and the Secretary of the Navy to secure, by purchase, condemnation, donation or otherwise, such basic patent or patents as they may consider necessary to the manufacture and development of aircraft in the United States and its dependencies for Governmental and civil purposes under such regulations as the Secretary of War and the Secretary of the Navy may prescribe, $1,000,000;

(*Continued on page* 234)

THE NEWS OF THE WEEK

New York to Have Seaplane Wharf

New York is soon to have a landing stage for hydro-aeroplanes and seaplanes within the limits of Manhattan Island, if a project planned by Dock Commissioner Murray Hulbert is adopted. The city received an application for wharfage for a plane and for a statement of rates for this form of dockage.

The application came from Lincoln G. Valentine, of the Central American Petroleum Corporation, who flew in a seaplane from Miami, Fla., for a test as to the possibilities of a commercial venture.

Judge Kenesaw M. Landis, Noted Jurist, Makes Free Balloon Flight

At 11:45 A. M., on April 5th, a free balloon flight of unusual interest took place at Fort Omaha when one of the large hydrogen inflated gas bags left the ground carrying on his first flight the ntoed jurist, Judge Kenesaw M. Landis, father of Major Reed G. Landis, second ranking American Ace, secretary of the Aerial League of America.

Judge Landis for many years has been an enthusiastic supporter of aeronautics and is not unacquainted with air travel for he has several times enjoyed the exhilaration of riding in a plane, but never before had he experienced that most delightful of all forms of transportation, the free balloon ride.

The trip was made in a 35,000 foot balloon piloted by Lieutenant Colonel Jacob W. S. Wuest, commanding the Fort Omaha Balloon School. The two other passengers on the flight were Colonel Joseph C. Morrow, aeronautical officer of the Central Department, and Mr. A. Lee Stevens, Chief Balloon Instructor. A special feature of the equipment carried was a receiving set of the new type Signal Corps wireless telephone with which the balloon was kept in communication with the ground set at Fort Omaha. Several messages were received during the flight.

The balloon landed at Anita, Iowa, after four hours flight, upon which the Judge was initiated into the pleasures of packing up.

Pomilio Returns to United States

Allesandro Pomilio, the well known Italian aeroplane manufacturer, returned to this country recently from Italy.

He predicts that a plane will be developed that will be perfectly safe and that manufacturers are learning more about aero dynamics and the strengthening of the various parts of the planes. That, he claims, is more important than cross Atlantic flights, which are not practical yet for commercial purposes. He stated that when the air has been conquered New York will be the money center of the world instead of London.

Pomilio is the builder of the famous Pomilio scout and reconnaissance machines.

Aerial Lines Planned to Atlantic City

Plans for conveying guests from New York and Philadelphia to the Hotels Chalfonte and Haddon Hall, at Atlantic City, N. J., by aeroplane or dirigibles are to be carried out in the near future.

Negotiations are under way for the purchase of large aircraft for this purpose, and it is likely that aerial passenger voyages will be in progress during the third Pan-American Aeronautic Congress to be held at Atlantic City next month.

Albert T. Bell, manager of the Chalfonte, is president of the Atlantic City Aero Club, and was one of the leading men in the work of bringing the second Pan-American Aeronautic Congress there.

The Traymore originated the aerial passenger bus feature a year ago and has two Curtiss planes which will make a series of trips between Atlantic City and New York during the aviation convention.

Allen to Campaign in Aeroplane

Colonel Frederick H. Allen, of New York City, with the aviation service in the World War, in the event that Governor Alfred E. Smith is not a candidate for a second term, will enter the race for the Democratic nomination and will do his campaigning by aeroplane.

Colonel Allen decided that an aeroplane would be the thing for him and if the State convention sees it his way he will be the first aspirant for a governorship to campaign his State by aeroplane.

Fly From Washington to Ottawa in Four Hours

Ottawa, Ont.—An aeroplane flight from Washington to Ottawa by United States army aviators was made recently in four hours and two minutes, exclusive of a stop at Ithaca, N. Y. The pilots were Colonel Hartney and Captain Douglas.

Lieut. G. W. Shaw Forms Flying Circus

Lieut. George W. Shaw, late of the United States Navy, and one of the original Stinson Flyers, has formed the Shaw Flyers, which organization has started on a tour, from its headquarters at Parkersburg, W. Va. On this tour Lieut. Shaw plans to cover all the Middle Atlantic and New England States.

Lieut. Shaw has purchased another Canadian Curtiss plane and the organization now has three planes in operation.

It is reported by Lieut. Shaw that the outstanding feature of his tours has been the fact that in all the cities they have visited, every one has brought to light one or more wealthy men or women who, after making a flight, have become interested in the possibilities of aviation, and many have purchased or ordered aeroplanes.

The personnel of the organization is as follows: Mr. A. O. Clark (treasurer of the New England Conservatory of Music in Boston), manager; pilots, Lieut. G. W. Shaw, Lieut. Ernest Decker, and Lieut. David Logg, of aerial mail fame, who is expected to join the Shaw Flyers at an early date; Theodore Lovington, chief mechanic, and his assistant, John Stewart, who were both flying sergeants in the U. S. Air Service.

Aerial Mail to Obtain Army Planes

In accordance with the last Post Office appropriation bill it was agreed that the Secretary of War is authorized to turn over to the Postmaster General, without charge, such motors, vehicles, aeroplanes, aerodromes and parts thereof, and machinery and tools to repair them, suitable for use in the postal service, and the Postmaster General is authorized to use them in the transportation of mails, he to pay the costs of transfer and maintenance, provided the aeroplanes and aerodromes are not used on any other routes than those between New York and San Francisco.

Plan Outdoor Aeronautical Show in Ohio

With the firm belief that the day is present when aeronautical shows should cease to be held under a roof and that the practical exhibition of aeroplanes is by actual demonstration of the performance of the machines, the Associated

© Photo by Fox News

The Super-Summer Sport. Miss Tommie Brown of St. Petersburg aquaplaning behind an Aeromarine Flying Boat

Aviation Clubs of Ohio, are planning to hold a grand out-door aeronautical show in Ohio early in July, the date and place to be decided upon by the delegates to the State Convention of Aviators at Columbus, May 6th, 7th and 8th.

The co-operation of the manufacturers of aircraft has been invited to help make this show a success and of great educational value to the public.

Daily flights to given points will be made to assure the public of the reliability and regularity of aeroplanes for practical use. Both land and sea planes will be exhibited, and the profits accrued from the show, will be used in the State of Ohio, educating every community within its border to the necessity of providing a municipal landing ground.

New Aircraft Gun to Be Given Tests

A new type of aircraft gun has been developed and soon will be given its final tests at Bolling Field, Washington, D. C. It is the outcome of a series of experiments made at the Poole Engineering and Machine Company, Woodbury, Md., and its development is said to have been due largely to Arthur S. Baldwin, manager of ordnance and chief engineer of the concern.

The new weapon, which is to be mounted on the bow of the aeroplane, fires one-pound shells at the rate of 120 per minute. The shells are fed into the chamber of the gun from a magazine controlled by the operator. The weight of the gun proper is only 129 pounds.

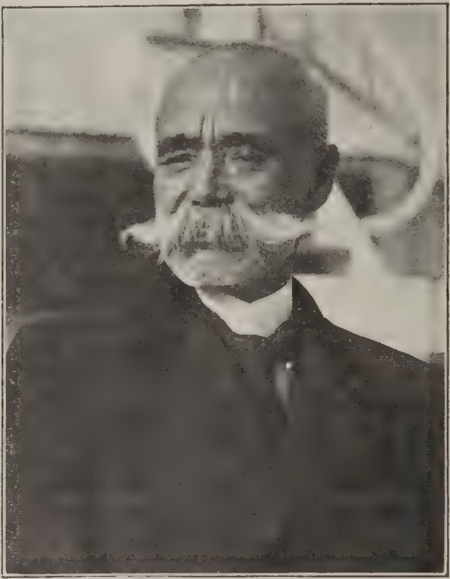
A novel feature of the new weapon is the method of sighting. A machine-gun of the type commonly used in aeroplanes is mounted alongside the barrel of the larger gun. The operator uses two triggers, one of which controls the machine gun, and it is with this he opens fire. Every fifth shot is what is known as a "tracer," a bullet containing substances which leave a trail behind of fire and smoke. When the operator sees from the tracer bullets that he has the correct aim, he opens fire with the one-pound gun. The machine-gun can be removed and a sight of the usual variety used when necessary.

Equip Planes with 8 Guns

Washington.—Four De Haviland aeroplanes have been equipped with machine guns and will soon be sent to the Mexican border for tests.

Each of these planes now carries two fixed synchronized guns, two fixed Marlin guns projecting through the floor of the pilot's cockpit, two flexible guns on the upper gun mount and two Lewis guns at the rear of the observer's cockpit.

The machine guns are so arranged that the pilot can fire his synchronized guns squarely at his target. As he gets closer he can raise the nose of the plane slightly, firing at the target with the lower forward guns. The pilot and observer thus have four sets of guns available as the plane comes within range and passes over the target.



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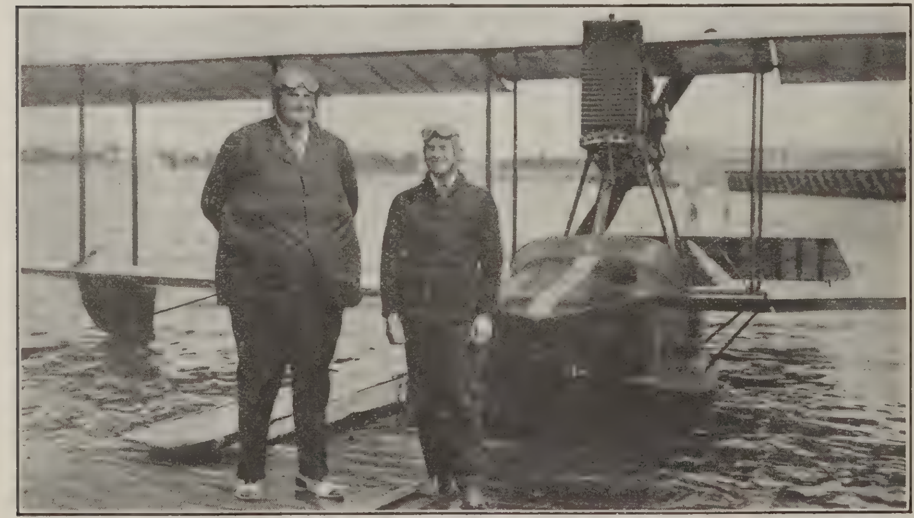
General Gaishi Nagoka, Chief of the Imperial Japanese Air Service, who is now on an official visit to the United States

Eaton Rapids Has Municipal Landing Field

Negotiations which have been carried on for the last few months by a number of former marine corps flyers has resulted in Eaton Rapids, Michigan, having a municipal landing field. This progressive little city of three thousand inhabitants has shown a worthy example to other localities and the men who were responsible for securing the field extend to all flyers an invitation to use their landing field when in the vicinity. It is properly marked in regulation fashion and arrangements have been made for a supply station.



The America Trans-Oceanic largest passenger. Weight 440 pounds, height 6 feet 8 inches. The pilot is Clifford L. Webster, and the passenger Arthur K. Woodman of Palm Beach

Elect Officers of Cleveland Aviation Club

The following officers and directors of the Cleveland Aviation Club have been elected at the first annual meeting held recently in the club rooms 543-5 Hotel Statler, Cleveland:

President, Major A. W. Harris; 1st vice-president, Sous-Lieut. Frank H. Boyd; 2nd vice-president, Lieut. T. J. Herbert, D. F. C.; 3rd vice-president, Lt. Col. R. S. Hartz; secretary, Lieut. Rex L. Uden, R. A. F.; treasurer, Cadet John R. Bloss; director, Lieut. C. B. Cunningham; director, Lieut. A. W. Craig.

The seven other directors comprising leading business and professional men in Cleveland are, Charles A. Otis, president Otis and Co., Bankers; E. E. Allyne, president Aluminum Castings Co.; Dr. John H. Quayle, famous surgeon; Walter C. Baker, vice-president Standard Parts Co.; E. S. Griffiths, president, Bishop Babcock Co.; Dr. George W. Crile, internationally famous surgeon, formerly in charge of medical work in France; N. L. Dauby, president The May Co.

The total membership is 186 pilots, 24 observers and 56 cadets.

A vote of thanks and confidence was extended to the re-elected officers for their good work during the past year, and plans for making Cleveland America's best air port were unfolded, and will be announced later.

New Brunswick, N. J., is Center of Aeronautical Interest

From present indications, the center of aviation and aeronautics in New Jersey seems to have centered itself definitely in the city of New Brunswick. The first step in this direction was taken several years ago, when the Wright-Martin Aircraft Corporation established a plant there for the manufacture of Hispano-Suiza aircraft motors.

The recent passage by the Legislature of a bill establishing a course in aeronautical engineering at Rutgers College marks another step forward. Mayor John J. Morrison has been greatly interested in this movement and much credit must be extended to him for the assistance given in the establishment in the very near future of a municipal landing field.

To encourage the opening of this new course at Rutgers, the city, through popular subscription, has raised a sum of money with which an aeroplane has been purchased and presented to the College. A Flying Club has been formed there and Rutgers is planning to enter the intercollegiate air races.

New Brunswick is preparing to make a strong bid for the establishment there of an aero squadron of the National Guard as soon as the State government authorizes this new department.

A permanent aerial and freight line has been established in New Brunswick, largely through the efforts of Elliott E. Underhill, formerly a pilot in the aviation service of the Marine Corps. A movement to establish a flying field along the Raritan River is supported by the Raritan Terminal and Waterways Association. It is proposed to make this field the headquarters of an aerial freight line transporting goods from ocean liners into the interior of the country.

Credit for the success which has attended the effort to keep New Brunswick in the van in aeronautical progress and development is largely due to the *Daily Home News* and the *Sunday Times*, local newspapers. Through the establishment of a department of aeronautics with a former army flier as editor, they have done much to arouse interest in flying.

The AIRCRAFT TRADE REVIEW

Avro Planes Arrive in San Francisco for Show

The Fowler Airplane Company announces the receipt of its first shipment of Avro aeroplanes to the Pacific Coast from the Interallied Aircraft Corporation, Eastern distributors.

R. G. "Bob" Fowler and W. H. Jones of the Fowler Airplane Company are placing the machines on exhibition at the Palace Hotel as well as at the Aeronautical Show at the Civic Auditorium.

The Avros will fly from the Marina at the waterfront, and plans are being made for installing a complete service organization and sales force throughout every city of any size or importance in the state of California.

One of the first inquiries to be received was from the city and county of San Francisco for a plane to be used on the city's water project at Hetch Hetchy in the High Sierras. Through the use of the aeroplane the men there can be paid off in a quarter of the time it used to take.

Banker Buys Plane for Business

Ralph H. Mann, President of the Park Trust Company of Worcester, Mass., banker, has purchased an aeroplane for business trips. Mr. Mann visited the Roosevelt Flying Field recently and purchased a Curtiss training-type plane, which he will have fitted up to carry banking documents between his home and New York. Mr. Mann will save several hours each week by using the aeroplane.

Curtiss Aeroplanes Arrive in Hong Kong

Word has been received by Guy T. Slaughter & Co., exporters, that 11 Curtiss planes shipped by them to the Orient to establish a commercial aerial route, have arrived at Hong Kong. With them went 16 aviators and mechanicians, most of them Americans. The backer of the enterprise, which is the first of the kind ever undertaken in China, is C. E. W. Ricau, a French resident of Macao.

The aerial service will connect Hong Kong and Canton with the Portuguese colony of Macao. Later the company expects to extend its activities to Manila and Tokio, touching at all points on the Chinese coast.

Walter Bonner, a veteran of the navy flying corps, will be general superintendent of the company.

Interallied Appoints Western Agent

The Interallied Aircraft Corporation, with headquarters in New York City, have just appointed the Fowler Airplane Company of 1065 Salem Building, San Francisco, as their western agents and distributors.

Aviator C. B. Coombs with Orenco

Sergeant C. B. Coombs, formerly of McCook Field, Dayton, Ohio, is now with the Ordnance Engineering Company at Baldwin, Long Island.

He will build a special aeroplane for the purpose of racing for the Gordon Bennett Trophy this year.

Coombs was voted life membership by the Aero Club of America for having attained a record of 139.3 miles an hour in a race encircling the Statue of Liberty.

Philadelphia Flying Company Elects Officers

The following men were elected as officers for the ensuing year of the Philadelphia Aero-Service Corporation at its meeting last Tuesday: President, Paul B. Huyette; Vice-President, W. L. Ferguson; Secretary and Treasurer, Charles L. Hower. In addition to the above the following directors were elected: Caspar Drueding, George E. Potts, E. A. Oberrender and George W. Krout.

Mr. Drueding, who was one of the organizers of the Company, has arranged to take the complete flying course at the Corporation's flying school, so as to acquaint himself with the practical problems of flying as well as its business side.

Evansville is Center of Aviation Activity

Evansville, Indiana, is destined to be the center of aviation for the United States in the very near future. Her admirable location on the map will be responsible in a large measure for her selection. Other cities along the proposed route from St. Paul to Havana cannot offer more for aviators and aviation than can Evansville. The Ohio River with its broad stretch of water in front of the city, forms an ideal landing spot for Hydroplanes. A convention is being planned to be held there this summer in the interest of this route.

Aviation has been given a big boost there by the locating of the Hurst Aeroplane Company in Evansville. The Officers of the Hurst Aeroplane Company are M. V. Yeager, President; E. H. Snyder, Vice-President; Will O. Ferguson, Treasurer; Paul H. Schmidt, Attorney; E. H. Hyman, Secretary. The Board of Directors are composed of business men.

The company has purchased a large two story brick building which they will use as a laboratory and assembling plant, until they can get their building erected at their own flying field. Evansville's big aviation field 80 acres in size and considered one of the finest in the United States has also been taken over by the Hurst Aeroplane Company.

On this field will be built the permanent factory of the company. According to present plans, it will be started this summer. In addition to their manufacturing plant the Hurst Aeroplane Company will maintain a complete repair department on the field for the accommodation of the many visiting aviators who come this way. The Club House will be in charge of the Aero Club of Evansville.

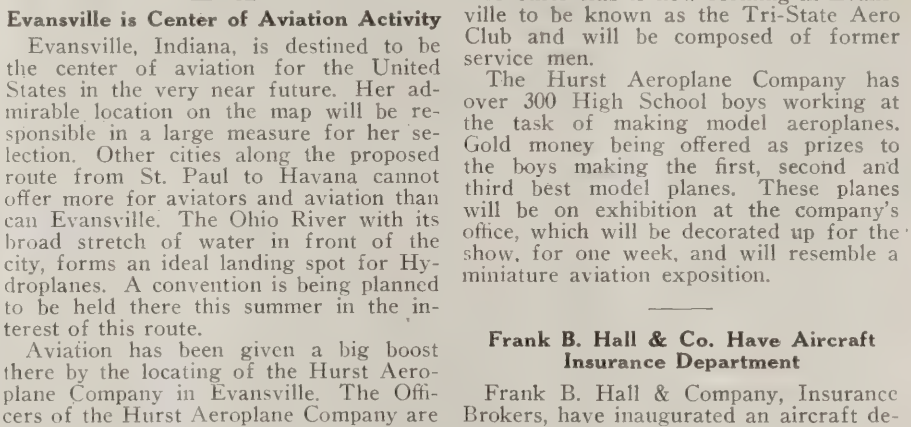
Secretary E. H. Hyman, the man responsible for the company moving to Evansville is secretary-manager of the Chamber of Commerce and secretary of the Evansville Manufacturers' Association and also secretary-treasurer of the Automobile Club of Evansville. He has been very much interested in aeroplanes ever since he located the first training school of Wright Bros. at Montgomery, Alabama, in 1909.

Another club is now forming in Evansville to be known as the Tri-State Aero Club and will be composed of former service men.

The Hurst Aeroplane Company has over 300 High School boys working at the task of making model aeroplanes. Gold money being offered as prizes to the boys making the first, second and third best model planes. These planes will be on exhibition at the company's office, which will be decorated up for the show, for one week, and will resemble a miniature aviation exposition.

Frank B. Hall & Co. Have Aircraft Insurance Department

Frank B. Hall & Company, Insurance Brokers, have inaugurated an aircraft department under the management of Captain Kelly, who has had eight years' experience as a pilot and instructor and over three years' war experience. This company is planning to write insurance covering fire from all causes, collision with the earth or any object, stranding or sinking, tornado, cyclone or windstorm, damage resulting from acrobatics or instruction.



The Model H-2 Curtiss motored Hurst biplane, manufactured by the Hurst Aeroplane Company, of Evansville, Ind.

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, Assistant to the Second Assistant Postmaster General in Charge of Aeronautics
S. Murray Moore, Jr., Chief of Maintenance and Equipment

J. Clark Edgerton, Chief of Flying
John A. Jordan, Chief of Construction
George L. Conner, Chief Clerk, Aerial Mail Service
John A. Willoughby, Operator in Charge Radio Experiments
Eugene Sibley, Operator in Charge Radio Maintenance and Operation
Eugene J. Scanlon, Chief of Supplies

US AERIAL MAIL

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Paul S. Oakes
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt

Charles I. Stanton, Superintendent New York-Washington Division
Walter H. Riddell, Superintendent, New York-Chicago Division
William J. McCandless, Superintendent, Chicago-Omaha Division
Samuel F. Doane, Manager, Heller Field, Newark, N. J.
William H. Read, Manager, Bustleton, Pa.
Duard B. Colyer, Manager, College Park, Md.
Andrew R. Dunphy, Manager, Chicago, Ill.
Maurice J. Kelly, Manager, Bellefonte, Pa.
William I. Votaw, Manager, Omaha, Nebraska
Victor W. Fitch, Manager, Newark Warehouse

PILOTS

Frederick A. Robinson
Walter J. Smith
Paul W. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris
Mark C. Hogue
Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen

To Rate Aerial Mail Divisions

Second Assistant Postmaster General Praeger has established an efficiency system for the Aerial Mail Service which is expected to insure the prompt departure of mail planes on schedule time, the maintenance of a speed of 80 miles an hour and the reduction of damage to planes and motors to a minimum. This system, which went into effect at the beginning of April, provides for three classifications of pilots, A, B and C, the increases of salary rating from A to C class being determined by the flying record of the pilot. The lowest rating is that of Class A, in which the pay is the basic salary of the employee plus the various war bonuses authorized by Congress. The compensation of pilots attaining to the rating of Class B receive 5 per cent greater compensation than Class A, and those attaining to the C classification receive a salary 10 per cent higher than Class A.

In order for a Division to obtain the Class B rating, it will be necessary in each quarter of the fiscal year for the Division to start 80 per cent of its aerial mail trips within 15 minutes of the scheduled time for starting; 85 per cent of the trips flown must be at the rate of not less than 80 miles an hour for a single motored De Haviland or a twin-motored Martin plane; 85 per cent of all trips must be completed without forced landings for any reason whatsoever; and finally, 90 per cent of all trips undertaken must result in no damage to plane or motor.

A Class C rating will be given when 5 per cent better performance under these four heads are made than that prescribed for Class B.

The ratings are made quarterly and the increases of salaries granted will be maintained so long as a division holds its class. The increases will be paid to the employees of each field by a supplemental warrant for the period during which the promotion was earned instead of as an increase of salary during the next quarter. Every employee in the Division from superintendent to watchman shares in the increases, thus inserting perfect team work between aviators and mechanics, and in fact all men engaged in operating the Aerial Mail.

Want Aerial Mail to Latin America

New Orleans.—The New Orleans Association of Commerce have voted to ask the Postoffice Department to establish an aerial mail route to Latin-American market centers from New Orleans. Landing stations on the route would include Tampico, Merida and Colon.

UNITED STATES POST OFFICE DEPARTMENT

NEW YORK-WASHINGTON—AIR MAIL SERVICE

Monthly Report of Operation and Maintenance

FEBRUARY, 1920

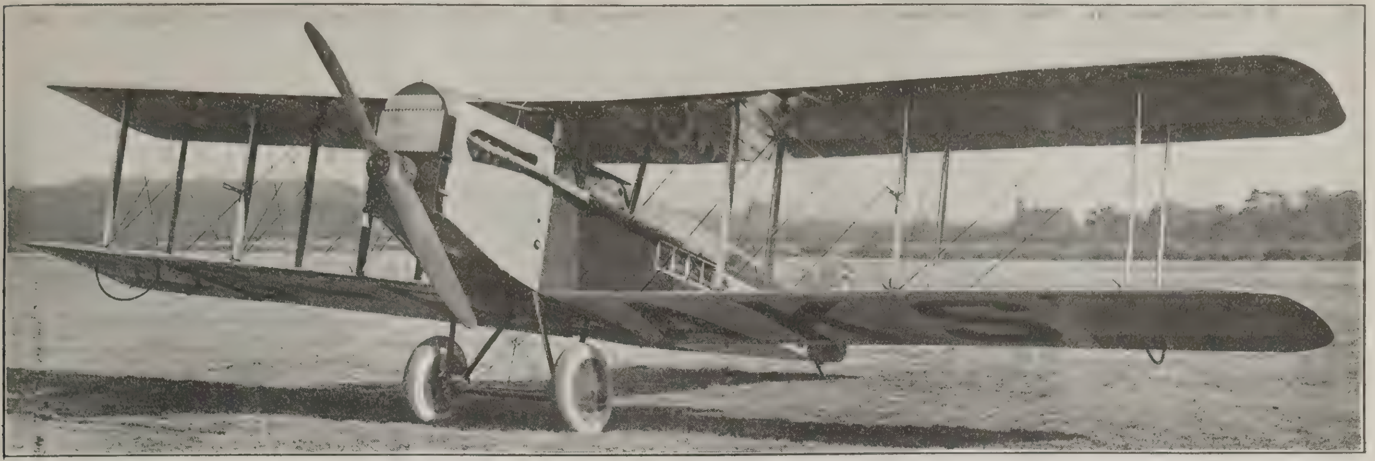
Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	SERVICE AND UNIT COST						
													Gallon of Gasoline	Total Time Run		Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
														hr.	min.				
12	$42.56	$14.00	$114.71	$80.01	$35.17	$62.91	$26.42	$83.01	$5.65	$46 24	$96.75	$607.43	152	2	15	195	1.3	$269.94	$3.12
30	24.92	11.76	114.72	80.01	35.17	62.91	34.25	123.60	1.80	72.50	96.76	658.40	89	2	55	170	1.9	225.72	3.87
31	208.40	49.95	114.72	80.01	35.17	62.91	263.02	207.29	68.58	72.50	96.76	1,259.31	815	22	24	1,935	2.4	56.22	.65
33	....	....	114.72	80.01	35.17	62.91	....	149.51	2,801.63	72.50	96.76	3,413.21	....	....		....	....	....	....
34	167.82	30.47	114.72	80.01	35.17	62.91	171.43	173.59	293.70	72.50	96.76	1,299.08	589	14	36	898	1.5	88.98	1.45
35	....	....	114.72	80.01	35.17	62.91	....	89.88	....	72.50	96.76	551.95	....	....		....	....	....	....
43	190.80	45.11	114.72	80.01	35.17	62.92	243.05	191.30	31.40	72.50	96.76	1,163.74	745	20	42	1,286	1.7	56.22	.90
48	178.92	55.99	114.72	80.01	35.17	62.92	164.78	307.22	98.20	72.50	96.76	1,267.19	665	14	02	982	1.5	90.30	1.29
49	193.34	38.37	114.72	80.02	35.17	62.92	196.29	255.35	76.03	52.35	96.76	1,201.32	678	16	43	1,586	2.3	71.88	.76
50	180.84	20.07	114.72	80.02	35.17	62.92	156.99	214.48	568.45	72.50	96.76	1,602.92	633	3	21	1,082	1.7	120.06	1.48
110	87.08	24.12	114.72	80.02	35.17	62.92	95.89	78.11	1.80	50.00	96.76	726.59	311	8	10	840	2.7	88.98	.86
44301	8.08	2.94	114.72	80.02	35.18	62.92	8.81	30.97	3.15	35.00	96.76	478.55	36	..	45	55	1.5	....	8.70
Total	$1,282.76	$292.78	$1,376.63	$960.16	$422.05	$754.98	$1,360.93	$1,904.31	$3,950.39	$763.59	*$1,161.11	$14,229.69	4,713	115	53	9,029	1.9	122.82	$1.58

Cost per mile, overhead, $.52; cost per mile, flying, $.33; cost per mile, maintenance, $.73.

Note: Plane No. 12, Curtiss JN4H, equipped with Hispano-Suiza 8 motor.
Planes Nos. 30 to 50, inclusive, Curtiss R4, equipped with Liberty 12 motors.
Plane No. 110, De Haviland, equipped with Liberty 12 motor.
Plane No. 44301, Curtiss JN4D, equipped with Curtiss OX5 motor.

*Includes $181.87 covering work preliminary to the inauguration of service between Chicago and Omaha.

OTTO PRAEGER, Second Assistant Postmaster General.



Sopwith "Wallaby" with 375 Rolls-Royce engine

SOPWITH COMMERCIAL AND SPORTING TYPES

THE Sopwith Aeroplane Corporation of America has just been organized with headquarters in New York City, and we are enabled this week to give details and photographs of some of the sporting and commercial types which they expect to have in operation in America in the near future.

The Dove

As a sporting two-seater the "Dove" is especially suitable; whilst fitted with dual control, it makes a most valuable machine for instructing pilots who have passed their preliminary tests before placing them on high powered single seaters.

The engine is an 80 h.p. LeRhone, which is very reliable, easy to run and economical on fuel.

Petrol is fed to the engine by gravity, consequently all pressure troubles automatically disappear.

The machine in general design is based on the "Pup". Both pilot and passenger are comfortably situated, possessing good visibility, whilst the low landing speed (about 35 miles per hour) enables it to be put down or taken out of the smallest possible field.

The various accessories of the engine are readily accessible and in the event of necessity the motor can be changed in four or five hours by two mechanics.

The under-carriage is of the "V" type consisting of stream line steel tubing, and is amply strong enough for the weight of the machine, consequently, the "Dove" can be landed on practically any kind of ground.

Fuel is carried for a period of 2½ hours at a cruising speed of 85 miles per hour, an adjustable tail plane being also fitted enabling the machine to be flown with a maximum of comfort.

Although light and most manœuvrable, the "Dove" from a flying point of view closely follows the "Pup", being perfectly "straightforward" and simple to control.

General Description

Engine	80 h.p. LeRhone
Speed	100 miles per hour
Speed variation	60 miles per hour
Climb	5,000' in 7½ minutes
Construction and landing gear	Normal rectangular fuselage "V" type under-carriage Rubber shock absorbers
Range (full throttle)	200 miles
Range (cruising speed)	250 miles
Maximum safe load	665 lbs. (normal load 550)
Weight of machine fully loaded	1,430 lbs.
Factor of safety	6
Ratio, useful load to total weight	27.6%
Span	25'
Height	9' 6"
Overall length	19' 6"
Chord	5' 1½"
Gap	4' 6"
Stagger	1' 4"
Dihedral	3° both planes
Loading	6.7 llbs. per sq. ft.
Personnel required to move on ground	2
Equipment	Air Speed Indicator Altimeter Compass Cross Level Watch Reverse Indicator
Stability of machine	Easy to fly and correct both laterally and longitudinally

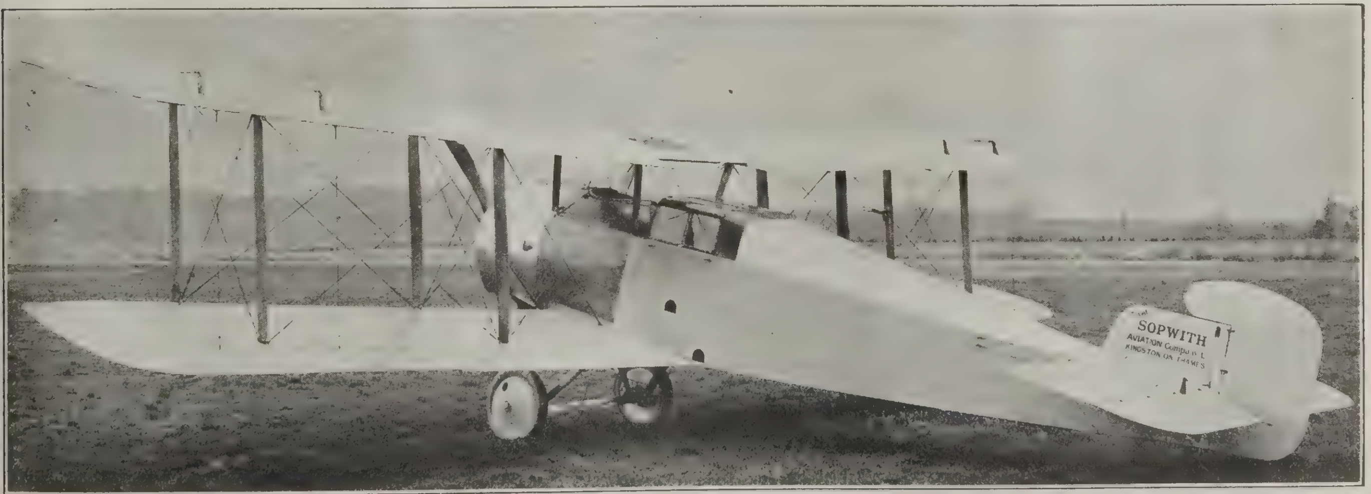
The "Gnu"

The "Gnu" has been designed to meet the requirements of a light, high speed machine for passengers or cargo. It can be either equipped with the 200 Bentley Rotary or with the 110 h.p. LeRhone.

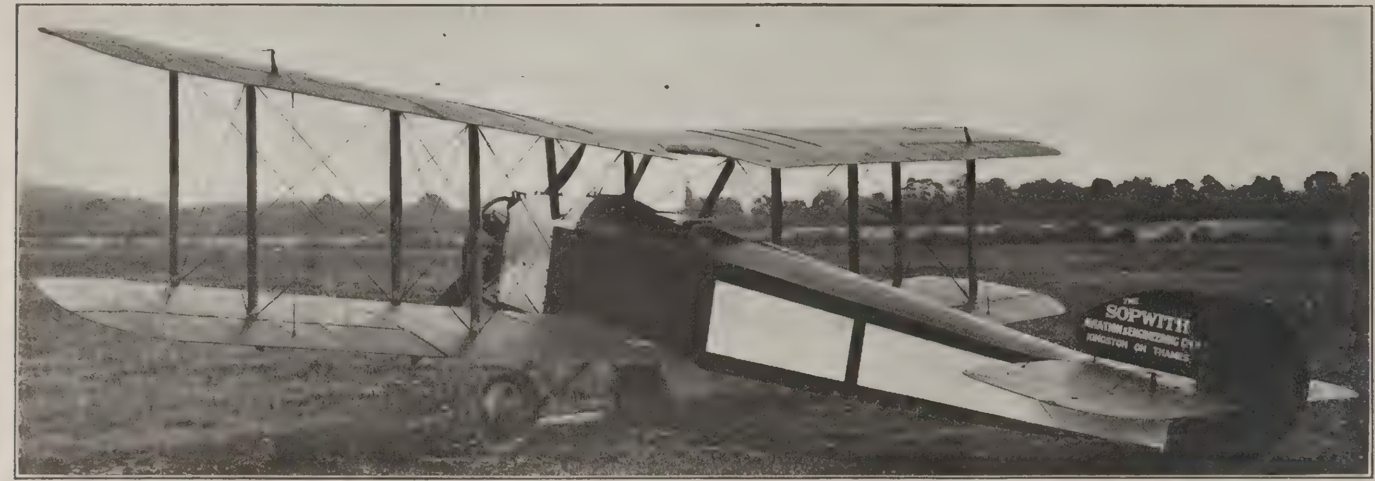
Accommodation is provided for two passengers or the equivalent in cargo, who are totally enclosed in a roofed cabin.

The pilot is placed in front and has very good visibility, being well protected from the "slip stream" enabling him to fly long distances without suffering discomfort.

The "Gnu" possesses a speed variation of 100% pulling up



Sopwith "Gnu" Three Seater with B.R.2 engine


THE SOPWITH AVIATION & ENGINEERING Co LTD KINGSTON ON THAMES

Sopwith "Grasshopper" with 100 H.P. Anzani engine

when landing and taking off—owing to its light weight—very quickly.

With the 200 h.p. Bentley Rotary, fuel is provided for a range of 250 miles, whilst in the case of the LeRhone-engined machine, this distance becomes 300 miles.

The engine unit is extremely accessible and in the event of necessity can be changed by two mechanics in five hours.

An adjustable tail plane is fitted, enabling the pilot to trim the machine to suit the particular load that is being carried at the moment.

The construction of the fuselage is on perfectly normal lines, and if necessary replacements or inspection can be easily carried out.

General Dimensions

Engine	200 h.p. Bentley Rotary
Speed	110 miles per hour
Speed variation	65 miles per hour
Climb	5,000′ in 5½ minutes
Construction and landing gear	Normal "V" type under-carriage Rubber shock absorbers
Range (full throttle)	200 miles
Range (cruising speed)	250 miles
Maximum safe load	820 lbs.
Weight of machine fully loaded	2,400 lbs.
Factor of safety	6
Ratio, useful load to total weight	341%
Span	38′
Height	10′
Overall length	25′ 6″
Chord	5′ 6″
Gap	5′
Stagger	11′
Dihedral	Both planes 2½°
Loading	6.85 lbs.
Personnel required to move on ground	2
Equipment	Air Speed Indicator Altimeter Compass Cross Level Watch Reverse Indicator
Stability of machine	Easy to fly and correct both laterally and longitudinally

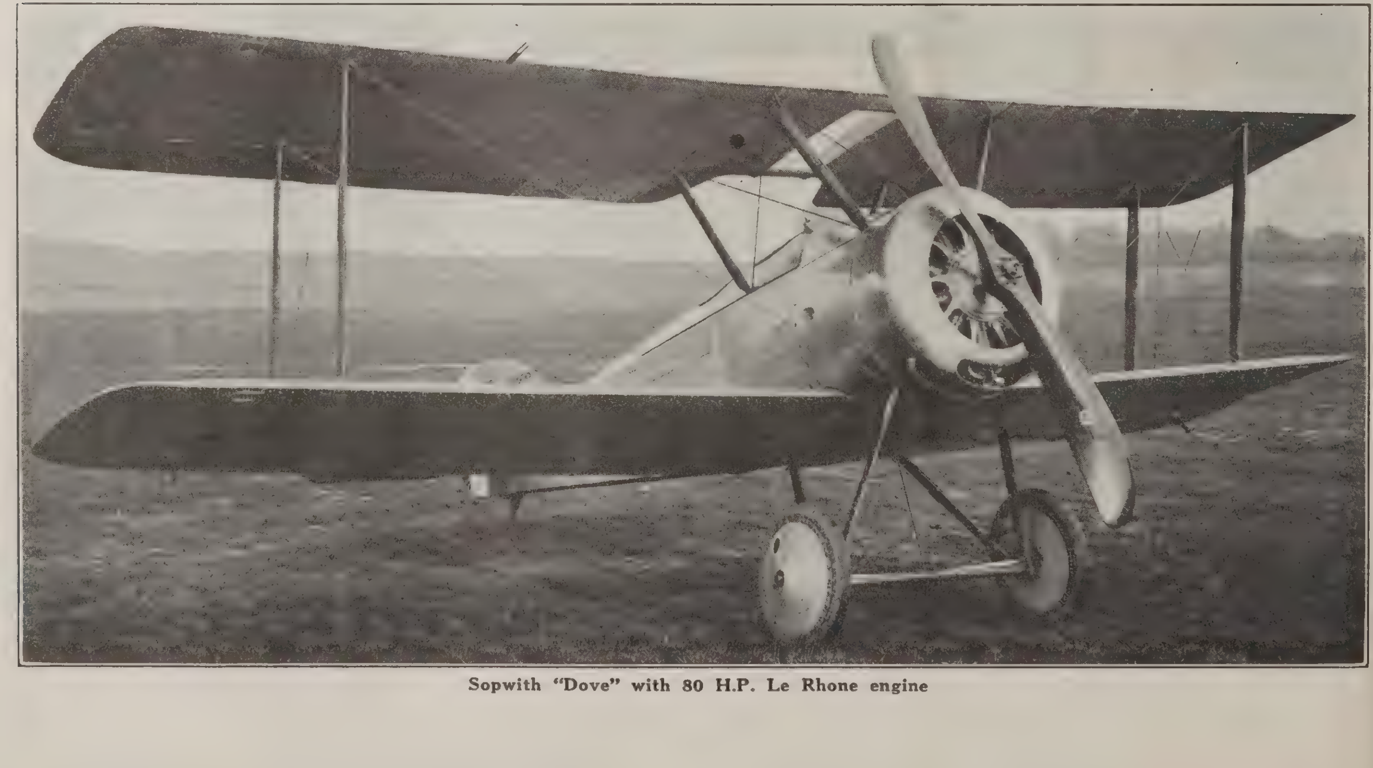
The "Grasshopper"

The "Grasshopper" has been designed to meet the requirements of a "straight through" type of training machine and represents, it is thought, a big advance on anything which has yet been built for that purpose. Although perfectly stable and practically "fool proof", the machine possesses a remarkable sense of "feel". All the controls are readily answered, being moderately light without being too sensitive. Controllability at low speeds is excellent.

Both pupil and instructor have very good visibility, and the pilot and passenger are comfortably situated and well protected from the "slip stream", enabling the pupil to concentrate his senses on actually flying the machine.

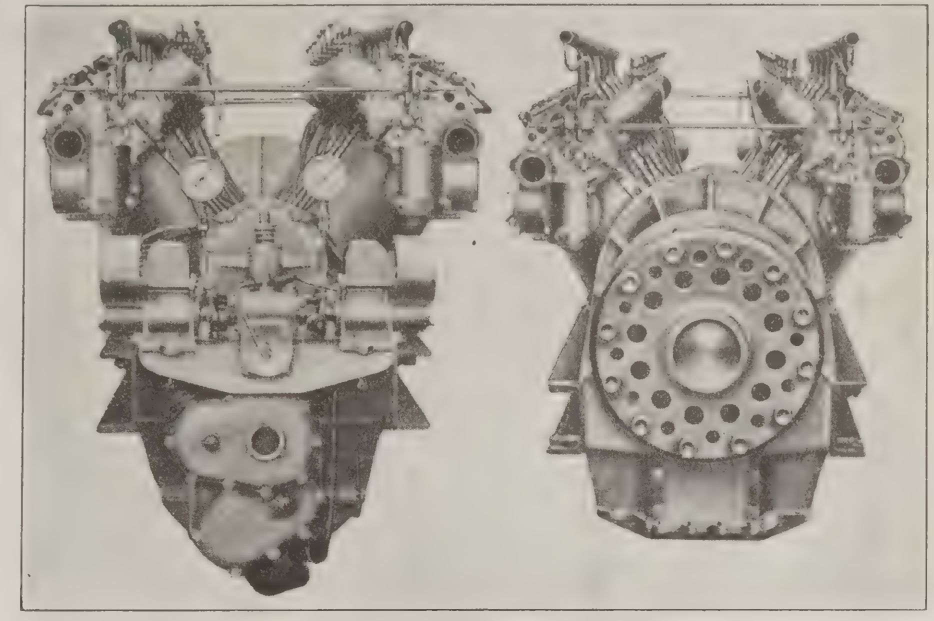
When taking off or landing, there is no tendency to swing in either direction, thereby greatly reducing the possibilities of a crash during the first solo flight. Landing speed is about 30 miles per hour, the machine being controllable to the very last. All ordinary stunting such as looping, rolling, etc., can be adequately taught. For side to wind landings, the machine is very good, the lateral control at low speeds being very good.

(*Continued on page 232*)



Sopwith "Dove" with 80 H.P. Le Rhone engine

THE 12-CYLINDER 800/900 H.P. SUNBEAM-COATALEN AIRCRAFT ENGINE



Front and rear end views of Sunbeam-Coatalen engine, showing magneto arrangement on the left

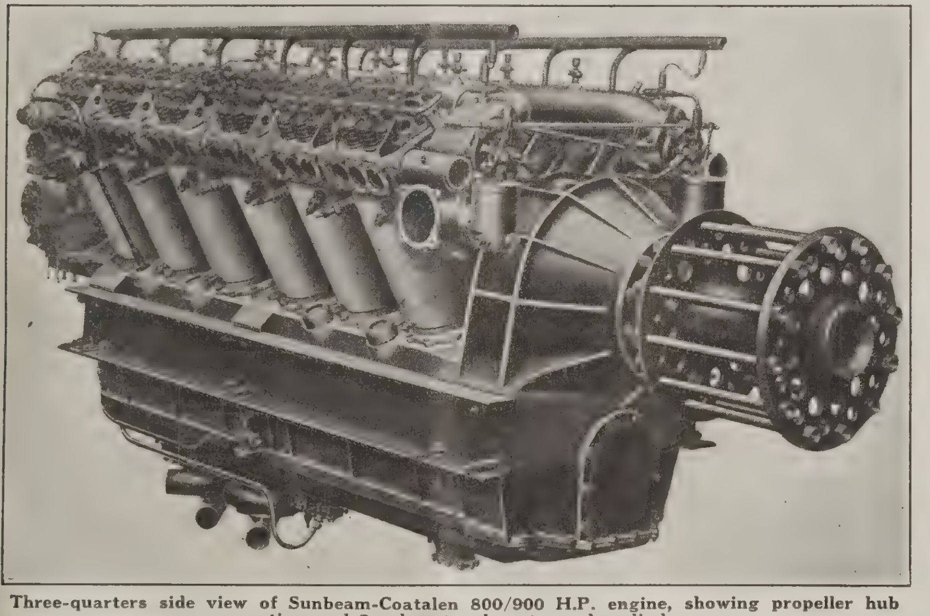
THIS engine is suitable for airships, large aeroplanes and seaplanes. It has twelve separate steel cylinders machined all over, and disposed upon the crankcase in two rows of six cylinders each, the rows being inclined to each other at an angle of 60 degrees. Any one cylinder can be easily removed without affecting the timing of the engine. The pistons are of aluminium, and the connecting rods are of forked pattern and of "H" section.

The valves, three inlet and three exhaust to each cylinder, are of the overhead type, and are actuated by push rods and rockers, the single central camshaft being housed within the crankcase at the base of the "V," and driven by gear wheel direct from the crankshaft. A feature of the design is the accessibility of the cam gear, it being only necessary to remove the cover at the timing end to enable the camshaft to be drawn out clear of the engine.

The hollow crankshaft is carried by eight die-cast, white metal bearings, and lubrication of these and the other working parts is by means of a compound pressure system.

The propeller shaft is driven indirectly by spur gear to the propeller shaft, which, with the thrust bearing, is mounted on an extension of the crankcase, cast on the engine.

Carburation is effected by means of four Sunbeam-Claudel carburetors of special type, two being situated at each end of the engine.



Three-quarters side view of Sunbeam-Coatalen 800/900 H.P. engine, showing propeller hub mounting and 3 exhaust valves to each cylinder

Ignition is by means of four 12 cylinder magnetos driven by skew gear and fitted with vernier type coupling to allow of fine adjustment. Two of these magnetos have a clockwise, and the remaining two an anti-clockwise, direction of rotation.

Both hand and electric starters are fitted to this engine.

Dimensions

Bore of cylinders....180 m/m. 7.086 ins.
Stroke of cylinders...210 m/m. 8.268 ins.
Total stroke volume of cylinders, 64113.6 c.cm. 4033.2 cu. ins.
Normal B.H.P.......850 at 1400 R.P.M.
Direction of rotation of propeller, Clockwise when viewed from propeller end.
Normal speed of propeller....920 R.P.M.
Oil pressure recommended, 40 lbs. per sq. inch to main engine details,
10 lbs. per sq. inch to auxiliary details.
Firing sequence of cylinders, 1, 1A, 5, 5A, 3, 3A, 6, 6A, 2, 2A, 4, 4A.
Direction of rotation of revolution counter drive viewed from driving end of spindle, Anticlockwise.
Weight of engine complete without fuel, water or oil, 1952 lbs.

REPORT ON AIRCRAFT SURVEYS

Aeroplanes, Engines, Balloons and Dirigibles Accepted By Air Service April 6, 1917, and November 1, 1919

THE following is a tabulation showing the number of aeroplanes, engines, balloons and dirigibles ordered by and delivered to the United States Air Service between April 6, 1917, and November 1, 1919, with the amounts actually disbursed on each contract, the status and scope of each contract and totals of all contracts by types.

Generally the number of aeroplanes by types accepted means the number of such, minus motors, and the number of engines represents the actual number of engines produced, regardless of whether they are in an aeroplane or out, with the following exception: Those orders for aeroplanes received in 1917 bearing serial numbers less than 10,000 included engines installed.

Figures showing receipts are those of Inspection Section, Procurement Division, Air Service, checked against the records of Expediting Section of the same division.

All other figures are those obtained by members of Liquidation Division, Air Service Branch, War Claims Board, from the disbursement records of the Zone Finance Office, Air Service Branch. It was necessary, due to shortage of personnel in the latter office, for the Liquidation Division to extract from the records such information as was desired for the purpose of preparing the answer to this resolution, and the Zone Finance Office assumed no responsibility for the accuracy. Subsequently the Zone Finance Office checked the page proof and its figures as checked appear following.

With respect to those orders, the liquidation of which was

(*Continued on page 222*)

Type of planes and contractor.	Order No.	Number ordered.	Number delivered.	Total disbursements.	Are disbursements complete?	Does order include spares?
Avro: British War Mission	721036	8				Yes.
Bristol Fighter: Curtiss Aero & Motor Corporation.	20387	2,000	26	$4,968,173.40	No	No.
Caproni Biplane:						
Standard Aero Corporation.	21164	2	2	242,941.07	Yes	Disbursements include spares.
Curtiss Aero & Motor Corporation.	21292	500		110,224.30	In liquidation.	No.
Fisher Body Corporation	21293	500			do	No.
The Italian War Mission	720634	1	1	49,227.79	Yes	No.
Total			3	402,393.16		
Triplane: Curtiss Aero & Motor Corporation.	6619	1	1	29,700.00	Yes	No.
De Haviland-4:						
Dayton-Wright Aeroplane Co.	20038-A	4,000	3,098	31,434,940.35	No	Disbursements also include spares and J-1 planes.
Do	20038-A-4	7	7			This order for remodeling.[1]
Do	20038-A-44	1,000			In liquidation.	No.
Fisher Body Corporation	20207-A	4,000	1,600	19,641,559.66	No	This payment also includes J-1.
Standard Aero Corporation	20516	500		7,390.00	Yes	Order canceled.
Do	20516-A	500	140	7,989,044.36	No	No.
Dayton-Wright Aeroplane Co.	20529-1	6	6	11,635.53	No	No.
Total			4,844	59,084,569.90		
E-1:						
Standard Aero Corporation	720169	30	30	104,250.00	Yes	No.
Do	720190	6	6	20,850.00	Yes	No.
Do	720351	1	1	3,475.00	Yes	No.
Do	720464	1	1	3,475.00	Yes	No.
Do	720660	422	90	1,339,731.79	In liquidation.	No.
Total			128	1,471,781.79		
Exp. Pri. Training: Pacific Aero Production Co.	7192	2	2	17,504.74	Yes	No.
Exp. Steel: Empire Art & Metal Co.	20478	12		15,000.00	Yes	No.
Handley-Page: Standard Aero Corporation.	20906	50	7	1,937,508.46		Disbursements cover assembly; cost of parts not included.
J-1:						
Standard Aero Corporation	8842	250	44	280,897.50	Yes	No.
Wright-Martin Aircraft Corporation	8832-A	50	50	325,000.00	Yes	No.
Dayton-Wright Aeroplane Co.	20038-A	400	400	(2)	No	Yes.
Standard Aero Corporation	20050	[3]100	56	269,102.50	No	No.
Do	20051	500	500	2,446,761.99	Yes	No.
Do	20051-2	150	150	664,252.82	Yes	No.

[1] This order is not included in total.

[2] Payment included with DH-4s.

[3] This order includes the 44 planes delivered on order No: 8842.

Type of planes and contractor.	Order No.	Number ordered.	Number delivered.	Total disbursements.	Are disbursements complete?	Does order include spares?
J-1—Continued.						
Fisher Body Corporation	20207-A	1,600	400	(1)	No	Yes.
Wright-Martin Aircraft Corporation	21021	1	1	$4,250.00	Yes	No.
Total			1,601	3,990,264.81		
JN-4:						
Curtiss Aero & Motor Corporation.	8435	600	600	4,746,044.00	No	No.
Do	20325	1	1	7,930.76	Yes	No.
Equipment Holding Co	8701	2	2	10,000.00	Yes	No.
Total			603	4,763,974.76		
JN-4-A: Curtiss Aero & Motor Corporation.	20003	1	1	8,160.00	Yes	No.
JN-4-B:						
Curtiss Aero & Motor Corporation.	7331	4	4	73,541.72	Yes	No.
Do	20091-A	1	1	11,783.60	Yes	No
Total			5	85,325.32		
JN-4-D:						
Fowler Airplane Co	9411-A	50	50	323,166.90	Yes	No.
Curtiss Aero & Motor Corporation.	20001	1,400	1,400	6,617,337.45	No	No.
Liberty Iron Works	20033-A	100	100	450,206.16	Yes	No.
Springfield Aircraft Corporation.	20062	400	400	1,981,736.31	No	Yes
Curtiss Aero & Motor Corporation.	20303	3	3	27,653.74	Yes	Yes.
St. Louis Aircraft Corporation.	20334	450	450	2,137,500.00	Yes	No.
Canadian Aero Corporation (Ltd.).	20440	100	100	433,000.00	Yes	No.
Do	20489	300	300	1,300,136.00	Yes	No.
United States Aircraft Corporation.	20524	50	50	326,170.10	Yes	Yes.
Springfield Aircraft Corporation.	21314	275	188	1,086,402.13	No	No.
Howell & Lesser	720312	75	75	300,000.00	Yes	No.
Liberty Iron Works	720314	100	100	400,385.00	Yes	No.
Springfield Aircraft Corporation.	720547	300		341,497.51	In liquidation.	No.
Sturtevant Airplane Co	720048	10			do	No.
St. Louis Aircraft Corporation.	720552	200			do	No.
Total			3,216	15,725,191.30		
JN-4D-2:						
Curtiss Aero & Motor Corporation.	720553	400	1	4,015.51	In liquidation.	No.
Howell & Lesser	720587	100		94,121.41	do	No.
Liberty Iron Works	720667	100		151,775.12	do	No.
Total			1	249,912.04		
JN-4H:						
Curtiss Aero & Motor Corporation.	20431	604	604	2,911,502.08	No	No.
Do	20873	1	1	5,660.00	Yes	No.
Do	21036	700	700	3,225,662.58	No	No.
Do	21291	94	94	341,854.50		No.
Total			1,399	6,484,679.16		
JN-6H:						
Curtiss Aero & Motor Corporation.	720705	6	6	21,207.00	Yes	No.
Do	720151	560	560	2,044,781.52	Yes	No.
Total			566	2,065,988.52		

[1] Payment included under DH-40.

Type of planes and contractor.	Order No.	Number ordered.	Number delivered.	Total disbursements.	Are disbursements complete?	Does order include spares?
Lepere:						
Packard Motor Car Co	21276	25	25	$734,279.38	No	No.
Do	720635	1,000		350,390.74	In liquidation.	No.
Brewster & Co	720641	500		200,000.00	do	No.
Fisher Body Corporation	720940	2,000		2,277.73	Yes; in liquidation.	No.
Total			25	1,286,947.85		
2-place reconnaissance:						
L. W. F. Engine Co	6462	21	21	392,245.00	Yes	Yes.
Do	8804	36	36	453,600.00	Yes	No.
Do	10410	1	1	9,000.00	Yes	No.
Do	10432	18	18	226,800.00	Yes	No.
Do	20131	18	18	226,800.00	Yes	No.
Do	20155	1	1	15,600.00	Yes	No.
Do	20541	36	36	309,600.00	Yes	No.
Total			131	1,633,645.00		
Martin bomber:						
Glenn L. Martin	20181	6	6	601,876.10	Yes	No.
Do	720860	4	4	220,699.17	Yes	No.
Total			10	822,575.27		
MB-1: Thos. Morse Aircraft Corporation.	20222	2	2	44,551.55	Yes	No.
Exp. military pursuit: A. S. Heinrich.	7214	2	2	11,328.00	Yes	No.
Twin hydroairplane: Gallaudet Aircraft Corporation.	6391	4	4	111,085.52	Yes	Yes.
Penguin: Breese Aircraft Corporation.	20315	300	300	591,325.85	Yes	No.
R-4:						
Curtiss Aero & Motor Corporation.	20403	1	1	14,500.00	Yes	No.
Do	20496	6	6	53,720.52	Yes	No.
Do	8460	36	1	14,000.00	Yes	No.
Total			8	82,220.52		
R. S. military pursuit: Schiefer & Sons.	20482	1	1	11,720.00	Yes	No.
S-4:						
Thos. Morse Aircraft Corp.	20047	150	150	790,000.00	Yes	No.
Do	720205	97	97	479,386.72	Yes	No.
Do	720577	500			In liquidation.	No.
Do	20448	350	350	1,792,165.00	Yes	No.
Total			597	3,061,551.72		
SE-5: Curtiss Aero & Motor Corporation.	21290	1,000	1	544,716.03	In liquidation.	No.
Standard M. defense: Standard Aero Corporation.	20328	2	2	22,000.00	Yes	No.
Standard JR:						
Standard Aero Corporation	20213	1	1	8,000.00	Yes	No.
Do	20341	2	2	46,486.00	Yes	Yes.
Total			3	54,486.00		
Side by side, model B. O. E. C.:						
Ordnance Engineering Corporation.	20281	2	2	$31,738.20	Yes	No.
Do	20327	6	6	113,004.78	No	No.
Total			8	144,742.98		
Steel military training: Sturtevant Aero Co.	20572	1	1	11,250.00	Yes	No.
U. S. D-9A. U. S. B-1:						
Curtiss Aero & Motor Corporation.	720904	2,000		3,582,278.53	In liquidation.	Yes.
Do	720904	4,000				
Model body: Lewis & Vought	8888	1	1	2,475.00	Yes	No.
Advance training, V E-7: Lewis & Vought.	20178	6	6	59,200.00	Yes	No.
V E-7:						
Springfield Aircraft Co	720772	500		47,593.57	In liquidation.	No.
Sturtevant Aero Co	720769	500			do	No.
Total				47,593.57		
Twin motor hydroairplane:						
Burgess Co	8969	1	1	26,009.50	Yes	Yes.
Standard Aero Corporation	8967	1	1	203,528.14	Yes	Yes.
Total			2	229,537.64		
Model airplane body: Pigeon-Fraser Hollow Spar Co.	8830	1	1	1,575.00	Yes	No.
1-place pursuit: Pigeon-Fraser Hollow Spar Co.	7398	2	2	17,500.00	Yes	No.
Flying-boat hull: Curtiss Aero & Machine Corporation.	9256	1	1	1,950.00	Yes	No.
DH-4 remodeled into DH-4B:						
Thos. Morse Aircraft Corporation.	640004	75			No	In production.
Gallaudet Airplane Corporation.	640005	75	29	28,927.50	No	Do.
Aeromarine Plane & Motor Corporation.	640006	75			No	Do.
L. W. F. Engine Corporation.	640007	75	11	15,732.50	No	Do.
Total			[1]40	44,660.00		
Remodeling DH-4 for post office: L. W. F. Engineering Corporation.	640009	6			No	Do.
Grand total all contracts for airplanes.		36,734	13,511	113,720,043.39		

[1] Not included in total.

(*Continued from page* 221)

incomplete as of November 1, 1919, no information is available as to the probable amount of settlement, which may, in addition to payments for finished articles, include raw materials, partly finished products, spare parts, amortization of special facilities, depreciation, overhead, commitment, etc.

With respect to those contracts which are to be closed, it will be noted that the amount paid includes not only the cost of the complete article, but spare parts in varying proportions, raw materials, and partly finished products turned back to the Government, amortization charges, etc.

Type of engine and contractor.	Order No.	Number ordered.	Number delivered.	Total disbursements.	Are disbursements completed?	Does order include spares?
Hall Scott A-7A:						
Hall Scott Motor Car Co.	8981	750	750	$1,776,752.26	Yes	No.
Do	30127	500	500	779,868.02	Yes	No.
Do	30713	2	2	368,159.77	Yes	Yes.
Do	530003	1	1	5,500.00	Yes	No.
Nordyke & Marmon	8440	1,000	1,000	2,366,000.00	Yes	No.
Standard Aero Corporation	8823	1	1	2,750.00	Yes	No.
Do	30133	1	1	3,315.00	Yes	No.
Total			2,255	5,302,345.05		
Hall Scott L-6A: Hall Scott Motor Car Co.	730704	2	2	14,330.98	Yes	Yes.
Hall Scott A-5A:						
Standard Aero Corporation	8967	38	38	203,528.14	Yes	No.
L. W. F. Engine Corporation	20155	1	1	(1)	Yes	No.
Gallaudet Airc. Corporation	6391	4	4	(1)	Yes	No.
Total			43	203,528.14		
Hall Scott 123: General Vehicle Co.	7545	1	1	2,750.00	Yes	No.
Gnome:						
Aeronautical Engine Corporation.	30128 30128-11	200	140	523,723.14	No	Yes.
General Vehicle Co.	8437	60	60	40,950.00	Yes	No.
Schiefer & Sons	20482	1	1	(1)	Yes	No.
Total			201	564,673.14	No	
Le Rhone:						
Union Switch Signal	30037	2,500	2,500	9,131,217.28	Yes	Yes.
Do	30037-2	30	30	60,000.00	Yes	No.
Do	730221	45	45	90,000.00	Yes	No.
Do	730227	10	10	20,000.00	Yes	No.
Do	730265	200			No	Yes.
Do	730247	1,200		[2] 830,081.61	No	Yes.
Total			2,585	10,131,298.89	No	
Lawrence:						
Excelsior Motor Manufacturing Supply Co.	30125	451	451	295,000.00	Yes	No.
Lawrence Aero Engine Corporation.	30280	1	1	21,000.00	Yes	No.
Total			452	316,000.00	Yes	
Sturtevant 5-A:						
B. F. Sturtevant Co.	7980	20	20	100,960.00	Yes	No.
Do	8043	6	6	26,700.00	Yes	No.
Do	8542	2	2	8,900.00	Yes	No.
Do	30184	44	44	165,440.00	Yes	No.
Do	20572	1	1	(1)	Yes	No.
Burgess Co.	8969	30	30	133,500.00	Yes	No.
L. W. F. Engineering Co.	20131	18	18	(1)	Yes	Yes.
Do	8804	36	36	(1)	Yes	Yes.
Do	10432	18	18	(1)	Yes	Yes.
Total			175	435,500.00	Yes.	
Hispano-Suisa:						
Wright-Martin	146	5	5	10,000.00	No	No.
Do	147	3	3	6,000.00	Yes	No.
Do	8807	500	500	2,750,000.00	Yes	No.
Do	30066	1,000	1,000	6,199,997.23	Yes	Yes.
Do	30173	6	6	25,000.00	Yes	No.
Do	30197	1,000	1,000	4,416,000.00	Yes	No.
Do	730516	1	1	2,000.00	Yes	No.
Do	30011-a	3,000	500	16,290,227.67	Yes	Yes.
Do	30011-A-I	2,000		2,840,881.58	No	Yes.

[1] These amounts are included in same contract covering airplanes.
[2] Liquidated.

Type of engine and contractor.	Order No.	Number ordered.	Number delivered.	Total disbursements.	Are disbursements completed?	Does order include spares?
Hispano-Suisa—Continued.						
Wright-Martin	30442	1,000	1,000	$3,810,270.99	Yes	No.
Do	31072	1,000	1,000	3,375,067.89	Yes	Yes.
Do	730020	3,000	750	[1] 14,517,034.21	No	Yes.
Do	730729	1,000		(2)	No	Yes.
Do	730771	13	13	26,000.00	No	No.
Do	730080	35	35	71,455.77	Yes	No.
Standard Aircraft	30075	1	1	5,500.00	Yes	No.
Pierce-Arrow	730083	5,000		[1] 1,584,164.81	Yes	No.
Total			5,814	55,929,600.15	No	
Liberty 8:						
General Motors Corporation.	730155	5,000		[1] 3,529,968.14	No	Yes.
Do	730810	15	15	72,241.05	Yes	No.
Willys-Overland	730179	3,000		[1] 2,046,031.46	No	Yes.
Total			15	5,648,240.65	No	
Liberty 12:						
Willys-Overland	730520	5,000		[1] 1,898,929.78	No	Yes.
Packard Motor Car Co.	10138	6,000	6,000	23,290,188.05	No	Yes.
Do	710880	130	130	100,306.57	Yes	No.
Do	730369	6,000	500	19,389,844.88	No	Yes.
Lincoln Motor Co.	10139	6,000	6,000	27,748,508.08	Yes	Yes.
Do	730584	11,000	500	18,111,477.10	Yes	Yes.
Ford Motor Co.	30035-A	5,000	3,950	24,205,554.56	No	Yes.
Do	730407	7,000		[3] 5,195,839.06	No	No.
Nordyke & Marmon	10449	2,000	1,000	15,649,240.38	Yes	Yes.
Do	730585	2,000		[1] No payments.	No	Yes.
General Motors Corporation.	30071-5	5,000	2,528	6,164,290.49	No	Yes.
Do	730155	5,000		[1] No payments.	No	Yes.
Trego Moters Corporation	10140	500	1	1,145,008.11	Yes	Yes.
Total			20,609	142,899,187.56		
OX-2:						
Curtiss Aero & Motor Corporation.	7404	27	27	187,559.23	Yes	Yes.
Do	7457	15	15	40,500.00	Yes	No.
Do	7513	20	20	74,425.66	Yes	Yes.
Do	7331	11	11	(4)	Yes	Yes.
Do	6619	1	1	(4)	Yes	No.
Equipment Holding Co.	8701	3	3	(4)	Yes	Yes.
Total			77	302,484.89		
OX-5:						
Curtiss Aero & Motor Corporation.	8028	10	10	55,037.25	Yes	Yes.
Do	9994	10	10	77,856.25	Yes	Yes.
Do	30027	25	25	75,000.00	Yes	No.
Do	8435	600	600	(4)	No	No.
Do	20003	1	1	(4)	Yes	No.
Do	20091	1	1	(4)	Yes	No.
Do	20303	3	3	(4)	Yes	Yes.
Curtiss Aero & Motor Corporation.	20091-A	1	1	3,000.00	Yes	No.
Do	30094	3	3	12,268.84	Yes	Yes.
Canadian Aero Co.	30164	100	100	252,000.00	Yes	No.
Willys-Overland	30002	5,000	5,000	10,260,910.36	Yes	No.
Do	30318	2,000	2,000	4,200,000.00	Yes	No.
Do	730308	1,500	1,500	2,625,000.00	Yes	No.
Willys-Morrow Co.	30185	1	1	400.00	Yes	No.
Total			9,255	17,561,472.70		
Bugatti: Duesenberg Motor Corporation.	30087-B	2,000	40	4,934,798.62	No	Yes.

[1] Liquidated.
[2] In liquidation.
[3] A. S. A. 39.
[4] These amounts included in same contract covering airplanes.

Type of engine and contractor.	Order No.	Number ordered.	Number delivered.	Total disbursements.	Are disbursements completed?	Does order include spares?
Van Blerck engines:						
Van Blerck Motor Co.	21282	2	2	$6,803.00	Yes	No.
Do	370247	1	1	1,682.25	Yes	No.
Do	480030	1	1	427.79	Yes	No.
Murray & Tregurtha	480014	4	2	34,584.00	Yes	No.
Do	480034	4	2	34,584.00	Yes	No.
Do	480078	2	2	34,584.00	Yes	No.
Total			10	112,665.04		
Wisconsin Type L-R: Wisconsin Motor Co.	41992	2	2	2,878.00	Yes	No.
Duesenberg: Ordnance Engineering Corporation.	20281	2	2	(1)	Yes	Yes
Fiat A-12 1st Motors: Italian War Mission.	720634	4	4	(1)	Yes	Yes
Cannon Typed Geared Hispano:						
Wright-Martin Air Corporation.	30089	4	3	32,333.34	Yes	No.
OX-3: Pacific Aero Products Co.	7192	2	2	(1)	Yes	Yes
Thomas:						
Thomas Morse Aircraft Corporation.	7709	2	2	9,200.00	Yes	No.
Do	9494	32	32	168,790.06	Yes	No.
Do	30010	5	5	126,000.00	Yes	No.
Do	30116	30	30	18,000.00	Yes	No
L. W. F. Engine Corporation	6462	21	21	(1)	Yes	Yes.
Total			90	321,990.06		
V-2:						
Curtiss Aero and Motor Corporation.	30067	1	1	6,000.00	Yes	No.
Do	30312	4	4	24,000.00	Yes	No.
Do	30942	2	2	12,000.00	Yes	No.
Do	20403	1	1	(1)	Yes	Yes.
Do	8460	1	1	6,000.00	Yes	No.
Total			9	48,000.00		
V-X:						
Curtiss Aero and Motor Corporation.	30015	2	2	8,500.00	Yes	No.
Do	30016	1	1	4,250.00	Yes	No.
Do	30017	2	2	8,500.00	Yes	No.
Do	30018	4	4	17,000.00	Yes	No.
Do	30019	3	3	12,750.00	Yes	No.
Do	30090	1	1	9,900.00	Yes	No.
Total			13	60,900.00		
Rolls-Royce "Hawk": British War Mission.	730896	8	8	(2)	No	No.
Sunbeam:						
Sterling Engine Co.	480082	1	1	3,612.00	Yes	Yes.
Do	480102	2	2	5,328.72	Yes	No.
Do	480103	1	1	2,739.87	Yes	No.
Total			4	11,680.59		
Vertical marine: Winton Gas Engine Co.	30297	1	1	1,485.00	Yes	No.
Grand total of all contracts for engines, including the number of engines received in airplanes as well as alone.		105,870	41,672	244,838,162.80		
Total expended for both airplanes and engines, including remodeling.				358,558,206.19		

[1] These amounts included in same contract covering airplanes.
[2] No payments

(*Continued on page 235*)

Preparation of Stock for Bending

To render wood pliable, both moisture and heat are required. Neither of these factors is fully effective in the absence of the other. There should be moisture enough, experiments at the Forest Products Laboratory indicate, to saturate the cell walls, which amount is equivalent ordinarily to a moisture content of 20 to 30 per cent. No better effect is noticed where there is additional water in the pores or open spaces of the wood. The pliability of wood apparently increases quite rapidly with increase of temperature. Very high temperatures, such as accompany steam under pressure, however, are not advisable, since they render the wood brash; in fact, boiling for any length of time permanently reduces the strength and toughness of wood to small fractions of their normal values.

Freshly cut stock is, of course, thoroughly saturated and needs no additional moisture. Only heat is required to produce flexibility. If the stock has dried for a long time, it will have a uniformly low moisture content throughout, probably about 12 to 15 per cent. Such material requires the addition of a considerable amount of moisture before it is in proper condition for bending. If the stock has dried for a shorter period, the interior part may be at a high moisture content while the exterior surfaces are quite dry. Such stock needs the addition of sufficient moisture to bring each part of it up to about 25 per cent.

Condensation of the steam may not furnish sufficient water if the stock is very dry; in this case the addition of a hot-water spray to play on the stock in the steam box would be advantageous. Admission of the steam through water will insure its being thoroughly wet. Pressure steam probably adds little if any to the moisture content.

During steaming, the stock should be so piled that steam has access to all sides of each stick.

United States Ar
Public Auctions of

Millions of Dollars worth of

Remember the date at Dayton—

DAYTON—OHIO

May 3 to 8, 1920

At which Sale the following items will be offered—

100,000 lbs. ALUMINUM in Sheets and Tubes
10,000 TURN BUCKLES
4,000 lbs. COPPER RIVETS
3,000 lbs. BRASS NAILS
5,000 lbs. IRON RIVETS
PROPELLER LATHES

60,000 gross BRASS WOOD SCREWS
1,000 lbs. ALUMINUM RIVETS
500 lbs. BRASS RIVETS
30,000 lbs. IRON NAILS
10,000 lbs. TACKS
15,000 gross STEEL WOOD SCREWS
WOOD TURNING LATHES

METAL-WORKING MACHINES
Hendey Tool-room Lathes, with yoke arm heads, Power Presses, Hand Screw Machines, Bench Drills, Baling Machines, Swing Saws, Band Saws, Multiple Spindle Drills, Planers.

METALS
10,000,000 lbs. Steel—round, hex., sheet and strip.
75,000 lbs. Brass and Copper—rods, sheets, tubing and wire.
30 tons Brass Scrap; 30 tons Copper Scrap; 500 tons Iron and Steel Scrap.

ELECTRICAL PRODUCTS
150 Motors, ½ to 100 H.P., all 3 phase, 60 cycle.
335,000 Rolls Insulated Friction Tape.
10,000 Electric Bulbs, and a great quantity of other electrical goods.

CHEMICAL PRODUCTS
1,800 Cans Lye; 250 Gallons Alcohol.
150 Bbls. and 200 five-gal. Cans Varnish, Enamel, Paints and Turpentine, and a great quantity of Chemicals.

SURVEYORS' INSTRUMENTS
75 Transits, 75 Levels, 450 Tripods.

MISCELLANEOUS SUPPLIES
50 Tons Rubber, 25 Tons Paper, 30 Tons Corrugated Paper, 50 Bbls. Roofing Tar, 500 Rolls Tar Paper, 26,000 ft. Wire Strap, 354,000 ft. Hard and Flexible Cable, 115,000 Bolts.
50 Computing and Platform Scales, 35 Singer Power Sewing Machines, 1 and 2 needles; 500 Doz. Cotton Gloves, 100 Doz. Rubber Gloves.
2 Dental Chairs, Photographic Material, 10,000 Pairs Leather Gloves, 150,000 Yards Mercerized Cotton Cloth, 2,000 lbs. Linen Thread, Commissary Equipment.
Blowers, Acetylene Generators, Electric Grinders, Brakes, Bowser Portable Gasoline Tanks, Anvils, Waste and Ash Cans, Wood Flooring and Partitions.

The material offered in this sale will be ready for inspection, with descriptive catalogues, April 24th to date of sale.

Catalogue sent on request.

Watch subsequent issues for details of succeeding auction sales at which other and similar material in large quantities will be offered.

For detailed information regarding Sale
Apply:—W. B. STRUNK, District Manager
L. C. WORTHINGTON, Sales Manager
DAYTON DISTRICT AIR SERVICE WAREHOUSE
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Air Service
Surplus Property

New Commodities & Materials
Sales You Should Investigate

As a matter of economy we would suggest that you get in touch with our nearest office *immediately.*

The service rendered by our District Offices may disclose an economical source of the material you need to keep the wheels of your factory turning.

SECOND SALE
NEW YORK DISTRICT
Sale Starting May 10th

For details of this sale, apply Capt. Robert Coper, Dist. Mgr., Mr. F. W. Weeks, Sales Mgr., 461 Eighth Ave., New York City.

FOURTH SALE
BUFFALO, N. Y.
Sale Starting May 24th

For details of this sale, apply Major J. P. Simons, Dist. Mgr., Capt. Harmon, Sales Mgr., 2050 North Elmwood Ave., Buffalo, N. Y.

THIRD SALE
CHICAGO, ILL.
Sale Starting May 17th

For details of this sale apply Capt. E. E. McCammons, Dist. Mgr., Mr. C. A. Pfau, Sales Mgr., 1819 W. 39th St., Chicago, Ill.

FIFTH SALE
DETROIT, MICH.
Sale Starting June 7th

For details of this sale apply Lieut. H. P. Adams, Acting Dist. Mgr., Mr. George P. Gallagher, Sales Mgr., Aviation General Supply Depot, Springwells, Detroit.

Send to nearest DISTRICT OFFICE for details of any sale

Separate catalogues of each Auction will be available 10 days prior to date of sale.

Each catalogue will contain Conditions of Sale, Quantities and detailed descriptions of all material and equipment offered.

Send in your name to be placed on our mailing list for copies of catalogues.

Any one of the Offices listed in this advertisement can give you information about any sale to be held.

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MACHINE TOOLS:
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SHOP EQUIPMENT:
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Motors, Generators, Motor-Generator Sets, Transformers, Wire, Cable, Conduit, and Lighting Fixtures.

CHEMICALS—PAINTS—OILS:
Varnishes, Shellacs, Dry Paints, Mixed Paints, Turpentine, Oils, Castor Oil, Dryers, Lacquers.

METALS:
Steel, Brass, Copper, Aluminum, Scrap.

FABRICS:
Cotton, Linen, Leather, Fabricoid, Felt, Cord, Thread, Tapes.

HARDWARE:
Screws, Bolts, Nuts, Spikes, Nails.

MISCELLANEOUS:
Contractors' Equipment, Containers, Drums, Building Materials, Fire Protection Equipment, Kitchen and Camp Equipment, Hoists, Plumbing Supplies and Fixtures, Leather and Rubber Goods, Hemp and Jute Products, Clothing, Shoes and other miscellaneous material.

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SMITH & JAFFE, Auctioneers
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New York City

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. AERIAL AGE *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in AERIAL AGE *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Disque's Demand for Unlimited Power

Your committee is not concerned with Disque's eight-hour shift army apart from its unwarranted use. The system of peonage exercised by private concerns, and the unauthorized expenditure of public money, aside from the illegal practice, caused the system or lack of system materially to affect the production of spruce, and a brief statement is made of further facts presented to the committee.

Col. Disque's inordinate grasp for power is set forth in a letter written by him to his liaison officer at Washington, Maj. Leadbetter (p. 1938). Therein, asking for unrestrained authority, he says:

> The solution and only one is to grant me unlimited authority to carry on this work according to good business methods and allot funds as requested.

This letter written on November 27, 1917, a few weeks after assuming control, was followed by continuous demands for more power until he obtained practically unlimited control of men, money and plans.

Remembering Col. Disque's slight "business experience," his statement is characteristic of men of his type. Ex-Gov. West, of Oregon, became a vigorous supporter of Col. Disque's ambitions and at Washington was an effective aid in interceding with Secretary Baker, the Air Service officials, Senators, and others who might clear the way (p. 1760).

Mr. West was a partner of McCullough, of Portland, who in turn was attorney for the Warren Spruce Corporation that had cost-plus contracts with the Government involving many millions of dollars. Lieut. Kerrigan says of this law partnership (p. 3446-3448):

> We will be able to prove that West & McCullough told Gen. Disque that they would give him free rein and unlimited power . . . and they in return were awarded contract for the Warren Construction (Spruce) Co. (p. 3447).

Mr. West and others pulled strings for Col. Disque, who worked every agency, while at Portland, until he finally secured unlimited authority. With the Government's millions at his command; with power to control labor and priorities; with his assumed power to commandeer timber, mills and private business generally, however distantly connected with spruce; with a large army of soldiers and a staff of sycophants surrounding him, the situation was unique in American affairs, though disheartening in its delay of spruce production.

Publicity Paid for By the Government

Col. Disque spent $47,255 (p. 2858) in organizing and maintaining a four "L" order of which he was head. Three publicity men were employed and paid by the Government, who continually sounded his praises in the press and in publications maintained at Government expense. Compared with Col. Disque's methods, Creel's memorable aeroplane advertising efforts were commonplace (p. 3811). Eighty-one soldiers were detailed to advance this four "L" service, to praise Col. Disque, and to curtail I. W. W. sentiment (p. 3689). After glowing eulogies of his chief during the war, Disque's publicity expert went to the Anaconda *Standard*.

> Mr. DONLAN. Mr. Richard Kilroy, a very clever writer, had charge of publicity.
>
> Mr. STEINBRINK. When he got through he became associated with the Anaconda *Standard?*
>
> Mr. DONLAN. As I understand (p. 3231).

Col. Disque surrounded himself with kindred spirits. Col. Stearns, formerly with Col. Disque in Texas, when both were lieutenants, without business judgment or experience, was made "chief of staff." Mr. Hitchcock, a lawyer from Cleveland, Ohio, the home of Secretary of War Baker, was brought to Portland, made a major, and given unprecedented powers for building railways and handling contracts in Oregon. Mr. Morley, another Cleveland lawyer, who kept insisting to the committee that he is "a Republican," was made a major overnight with a swivel chair job at Col. Disque's Portland headquarters. Mr. Lenihan, also from Cleveland, became a full-fledged "major" at Portland through a touch of Col. Disque's wand. Mr. Eaman, a Michigan lawyer, who selected Disque for warden when a member of the State board the year before, was also installed in a major's easy chair at Portland headquarters. Twelve hundred other officers of various ranks and degrees were under Col. Disque's command. The "majors" above named all appeared before your committee and were loud in their praise of Disque and his methods. Many others who knew absolutely nothing of spruce or lumbering were selected for his chief advisers and associates during 1918.

Distinguished Service Medals for the Spruce Officials

In September, 1918, just prior to the armistice, within a few days after Col. Disque's promotion to the rank of brigadier general and in return for their unstinted devotion a score of these gallant warriors stationed at the palatial Portland headquarters, including Maj. Eaman, who entered the service and received his commission about six weeks prior to the armistice, were all recommended by Col. Disque, a few days after his own promotion, to the Secretary of War for distinguished service medals (p. 1693). Such medals could be recommended only by a general and the interest in Col. Dsque's promotion was evidently of mutual concern. This picture gives a partial understanding of the mutual admiration society in the Spruce Division. The early ending of the war, several weeks after Col. Disque's promotion, presumably prevented the 20 spruce officers, including Maj. Eamon, of six weeks' service, from receiving distinguished service medals. Both Gen. Squier and Gen. Disque, however, were among the 554 American officers awarded such medals.

Gen. Pershing, in his final report, says of the doughboy at the front:

> Finally the memory of the unflinching fortitude and heroism of the soldiers of the line fills me with greatest admiration. To them I again pay the supreme tribute. Their devotion, their valor, and their sacrifices will live forever in the hearts of their grateful countrymen.

Out of over 1,000,000 American enlisted soldiers engaged on the fighting front only one enlisted man, a sergeant, received from the Secretary of War a distinguished service medal.

Viewpoint of Other Men Then in Service

Personal charges against Col. Disque and his associates were numerous. The testimony of one witness shows the range of complaints that were made by witnesses from Seattle to Los Angeles.

Capt. Turner, a trained officer, forceful and fearless, said that of 109 soldiers given him by Col. Disque, only 7 were familiar with the woods and 102 were wall painters, polishers, etc. (p. 1197). Capt. Turner had charge of 140 soldiers at Stillwater camp and testified that his men were working for private parties on commercial logging entirely. No spruce timber was in that section; no aeroplane lumber was cut there. Two soldiers while thus working for private interests were killed by falling trees (p. 1214). Deserving men were not considered, he testified, but official favoritism was common.

(*To be continued*)

NAVAL and MILITARY AERONAUTICS

Test 17-Pound Gyroscopic Compass in Aeroplane

For the first time in the history of aviation a gyroscopic compass was used successfully as a navigating instrument in an aeroplane. Gyroscopic compasses embodying practically the same principles have been used for several years on American and foreign war vessels as well as the merchant marine, and particularly on submarines who depend almost solely upon an instrument of this kind when submerged. The gyroscopic compass as used upon watercraft weighs 2,000 pounds, and is quite bulky.

The chief problem in adapting a gyroscopic compass for aerial navigation was to design a similar apparatus where weight and bulk commensurate to aeroplanes with the same accuracy and dependability of the marine type as a result of laborious experimentation that looked hopeless, a model was made weighing only 17 pounds, 14x13 inches, and tested in flight. The chief advantages over all former types or magneto compasses are: compass card free from spinning; indicates a true geographic north; no magnetic effect.

Open Enlistments for Balloon and Airship Division

The Director of Air Service announces that enlistments are open for service in the Balloon and Airship Division to High School graduates, or to men who have a statement from a Commanding Officer of an Air Service station or properly constituted trade test board to the effect that applicant is technically qualified for such enlistment. The enlistment of 1,600 men for the Airplane Division, and 900 for the Balloon Division has been authorized, 1,930 of which may be one year enlistments.

The lighter-than-air branch of the service offers opportunities to enlisted men in a variety of specialties. In connection with observation balloons, specialists are needed for motor transportation and for the operation of winch engines. The manufacture and use of hydrogen gas requires the training of a considerable number of men in chemistry and gases.

The various instruments used in connection with the operation of balloons and airships and in connection with the collection of meteorological data necessitates the training of instrument repair men to adjust, calibrate delicate and sensitive instruments. Enlisted men will also be required as radio operators, engine men, and steersmen on the flying crews of airships.

Men who are interested should apply to the nearest recruiting officer or to the nearest Air Service station for additional information.

Army to Buy Selfridge Aviation Field

In passing on an appropriation of $27,500,000 for army aviation, the House adopted an amendment offered by Representative James, of Michigan, directing the War Department to purchase the Selfridge aviation field, in Michigan, at a cost not exceeding $190,000.

Board to Test Aerial Cameras

Capt. Albert W. Stevens, Lieut. Lewis McSpaden and three Air Service officers on duty at the Air Service Engineering Division, Dayton, Ohio, have been designated by Major Gen. Charles T. Menoher, Director of Army Air Service, to constitute a board of officers to meet at McCook Field, for the purpose of testing various types of aerial cameras to determine which is most suitable for use by the Air Service. Representatives of the U. S. Geodetic Survey and U. S. Geological Survey are expected to be present at the tests. It is believed that these tests will have the result of crystallizing the various ideas and methods that have been proposed in the application of aerial photography to mapping.

Practice Aerial Combat by Kelly Field Groups

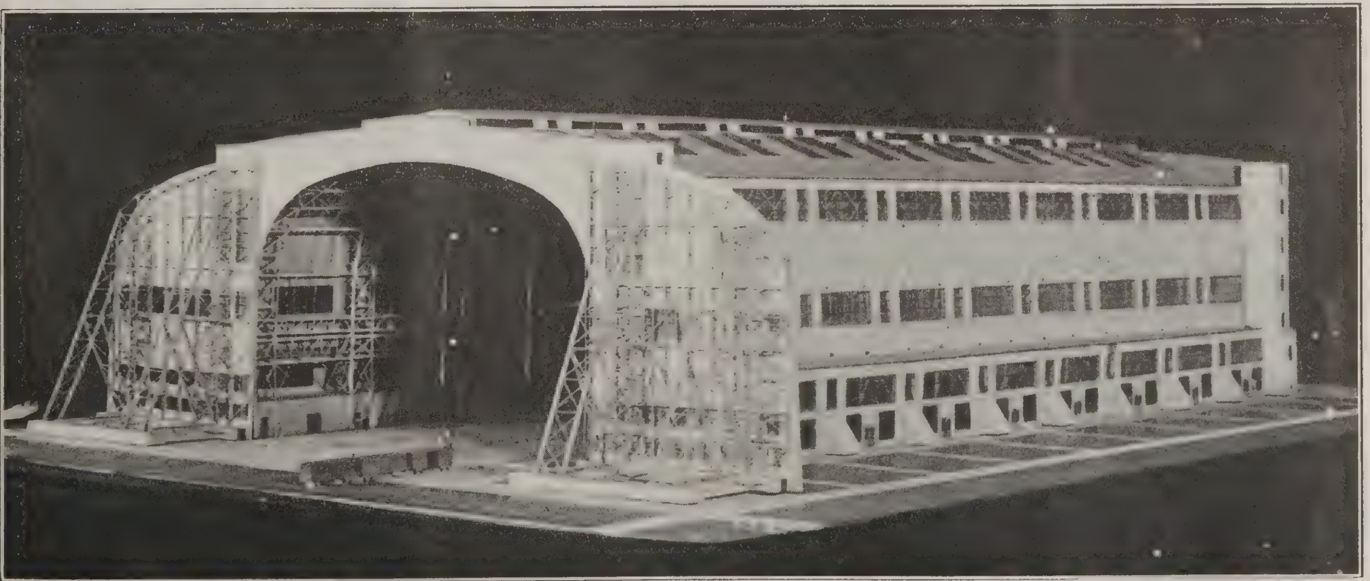
An interesting and instructive liaison was worked out between the Bombardment and Pursuit Groups recently. Five D. H.-4s were sent on a bombing mission in formation with the towns of Lytle and Moore and the I. & G. N. R. R. between them for a target. The I. & G. N. R. R. was the dividing line between the friendly and enemy territory, all ground west of the railroad being considered enemy territory. A protection flight of five S. E.-5s was picked up at 5,000 feet over Lytle and a few minutes later the enemy formation of five more S. E.-5s attacked. The bombers held their formation while the two scout formations had a regular dog fight. Several of the observers in the bombing formation were able to use their camera guns to good advantage and from the pictures one might reach the conclusion that each plane in all three formations was shot down several times by as many pilots, or observers. Every plane participating was equipped with a camera gun.

Discuss Carbureters for Army Aviation Service

Major George E. A. Hallett, U. S. Air Service (aeronautics) is on temporary duty for the Aviation Service of the Army, consulting with the Stromberg Motor Devices Company, Chicago, on carbureters. He will return to Dayton, Ohio, upon the completion of the consultation.

Investigates Gyroscopic Instruments for Aerial Navigation

First Lieutenant John P. Van Zandt, of the U. S. Air Service, is on a trip for the purpose of investigating gyroscopic instruments relating to aerial navigation. He will reach New York City, Washington, D. C., Schenectady, N. Y., and Lynn, Mass.



© Underwood & Underwood.

The mammoth dirigible hangar which will house the R-38 on its arrival in the United States. It is 800 feet long, 265 feet wide and 174 feet high, and is located at Lakehurst, N. J.

FOREIGN NEWS

Much Flying by London, Paris and Brussels Aerial Services

On the Handley Page Continental Aerial Services between September 2, 1919, and March 20, 1920, inclusive, 1,114 passengers and 58,123 lbs. of freight have been carried over a distance of 81,929 miles.

Some of the flights on these services were carried out in extremely bad weather and were considered impossible of accomplishing in view of the fog or gale.

A Handley Page machine left Paris for London one day, with five people and 1,250 lbs. of freight on board.

Flying in the face of a strong wind at a height of about 1,000 ft., it reached the coast where it ran into fog with a visibility of only 10 to 14 yds. The pilot considered it quite safe, however, to continue, and flew the Channel, the journey occupying 1 hour 5 minutes.

Training Chinese Pilots on Avros

It is understood that the training of Chinese pilots will begin this month on some Avro machines which arrived recently. Three Handley Page aeroplanes have been handed over to the Chinese Government.

Seaplanes Fly Between Rome and Athens

The two Italian 300-h.p. Savoia seaplanes arrived at Athens recently from Rome, having accomplished the journey from Brindisi to Athens in three hours. The pilots are Captain Vespignani and Sergeant del Maschio, who are accompanied respectively by Captain Ripamonti and Signor Mattioli, the latter a representative of the "Messaggero."

Letters from H.M. the King of Italy to H.M. the King of the Greeks were carried and also some official mails. Leaflets were thrown over Athens sending greetings from the Italians to the Greeks.

To Explore Canadian Forest by Seaplane

Hoffar Bros., of Vancouver, are constructing a seaplane for Price Bros., of Chicoutimi, Quebec, paper makers, who intend to use the machine for the exploration of forest areas.

The Royal Air Force Gift to Australia

It is now known that the British Air Ministry gift to the Commonwealth of Australia includes 30 S.E.5a (180-h.p. Hispano-Suiza), 35 D.H.9a (400-h.p. Liberty), and 30 Avro (130-h.p. Clerget) aeroplanes together with 25 per cent. spare engines, squadron field transport, motor workshops, tools, gunnery, photographic and W/T equipment of the latest type, with spares calculated on a basis of six months' war service. In addition, there are a sufficient number of Besonneau hangars included for the housing of three squadrons in the field.

It is expected that the machines will be ready for assembly at the Central Flying School, Point Cook (Victoria), soon, and on the formation of the Commonwealth Air Force would be allotted to the first three training squadrons.

The Command of the South African Flying Corps

It was announced in Cape Town recently that the Union Government of South Africa had appointed Wing Cdr. van Ryneveld to the command of the South African Flying Corps. It is not stated whether this is a reward for his flight from England to the Cape.

Flights Over the Andes

Capt. Parodi, the Argentine airman, recently crossed and re-crossed the Andes, flying from Mendoza to Santiago and back without a landing. A later message says that Capt. Zanni had flown from Argentina to Santiago, where he landed, and back.

Columbian Seaplane Service

A service of seaplanes between Barranquilla (Colombia) and Girardot will be inaugurated. The journeys will take nine hours, and short calls will be made at various towns. The service is for cargo and psssengers.

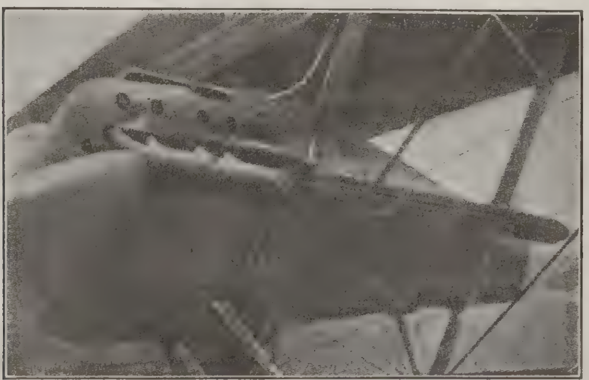
Roget Flies with Air Compressor

Paris.—The flight by the French aviator, Henri Roget, from Paris to Lyons, a distance of 450 kilometers, in one hour and fifty minutes, has aroused great interest because of its special feature.

Roget, who was one of two pilots who flew across the Mediterranean and back in a single day some time ago, used on this occasion a Breguet aeroplane with a 300 horse power engine which was adapted in such a way as to enable flight to be made at the great height of 5,000 to 6,000 meters.

The feature in Roget's motor for his wonderful flight is a turbo compressor or turbine, which is worked by gas from the exhaust. This turbine forces air into the carburetor and so secures perfect compression of the motor which otherwise is impossible in rarified atmosphere.

Furnished with similar apparatus and flying at a great height, another pilot, Romanet, flew from Paris to Madrid in eight hours.



Schneebeti Silencer fitted to Lorraine engine on the Farman F.50

Australian Flyers in India

Lieuts. MacIntosh and Parer on their Airco machine reached Karachi and reported having met with frequent sandstorms on the flight from Chahbar between Karachi and Bandar Abbas. Capt. Matthews, having flown to Delhi on his Sopwith Wallaby, has been detained there with a broken propeller.

Flight from Tokyo to Seoul

Two Sopwith aeroplanes and one Salmson, piloted by Japanese military officers, who have been instructed by French officers, have recently succeeded in flying from Tokyo to Seoul in Korea. The flight was commenced by five pilots, but one Sopwith and one Salmson had forced landings on the way.

M. Poulet at Moulmein

Arriving at Singapore recently, M. Poulet proceeded at once to Moulmein in order to get his aeroplane in order, so as to continue his flight to Australia.

Handley Page Extended Programme

To cope with the augmented summer services, Messrs. Handley Page, Ltd., of England, are putting a larger number of aeroplanes into commission. These will all be of the standard "O" type hitherto used, but a departure will be made in the method of fitting them out.

The machines used have been fitted out as aerial limousines comprising a cabin in the rear for six passengers, a cargo hold in the centre, a forward cabin for two passengers and two passenger seats in the nose, thus combining freight and passenger traffic. The new machines for this summer are to be arranged definitely either for passengers or cargo.

The machines provided solely for passenger carrying will comprise a saloon generally on the principle of the O/7 type but with various improvements that were introduced into the W/8. The aeroplanes for cargo will consist almost entirely of a cargo hold, but a small cabin will be provided in the rear for the accommodation of two or three passengers. There will always remain the two passenger seats in the nose.

It is intended to run a daily service of passenger planes to Paris and a service of freighters on alternate days. The Brussels service will be alternately passenger and freight machines daily. The services in respect of parcels and other freight will therefore remain as now, while passengers will be carried every day to each capital. The cargo machines flying on the alternate days will be able to carry three passengers in case of need.

This improved type of passenger machine is to be known as the Handley Page O/10, while the new cargo machines will be described as O/11. Externally they are both similar to the O/7.

It has been decided to extend the service by machines of the "O" type rather than of this year's model, the W/8. The accommodation is exactly the same in each, and the "O" machines have a disadvantage only of a slower speed. It is not proposed to alter the fares and freights now charged.

Three Italian Aero Squadrons at Albania

The 8th Group of the Italian Air Service is at present stationed in Albania, and consists of the 11th Squadron (Caproni), 85th Squadron (Hanriot), and 116th Squadron (Salmson and S. V. A.). Since the war this Group has been engaged in running the aerial mail and carrying official passengers across Albania.

One notable flight made, which, incidentally, happened to be the last flight of the war, and the first flight of peace in that part of the world, was accomplished by Serjeant-Major Ivone and Lieut. Pagnoni, on a Salmson biplane, escorted by three Hanriots, who, on November 6th, flew from Valona to Scutari, with the Armistice note.

For the aerial mail the three squadrons are stationed: No. 85 at Piskupi, No. 116 at Valona, and No. 11 at Tahiraga, with a composite squadron at Durazzo.

In addition, an aerial-photographic survey is being made of the country preparatory to the construction of a Trans-Balkanic Railway.

Plan Flight from Holland to Dutch East Indies

The Dutch Government has had under consideration for some time the question of the practicability of an aeroplane flight from Holland to the Dutch East Indies. It has been decided to offer a large money prize to the Dutch aviator who first completes the journey.

Already three competitors have come forward to make the attempt, and it is expected that a start will be made soon. Lieut. Backer and Lieut. Wullften Palthe propose to fly together in a flying-boat, and have secured a Vickers F.3. fitted with two Rolls-Royce Eagle engines.

These aviators will leave Felixstowe or Calshot for Amsterdam, where they will take on board a rigger and a mechanic. The proposed route is then Brest, Marseilles, Taranto, Piræus, Adalia, Basra, Bander Abbas, Karachi, round the coast of India to Calcutta, Rangoon, Penang, Singapore, Batavia (Java).

Arrangements have been made for the supply of spare parts and petrol along the route. The journey has been divided into 26 stages of an average distance of 400 miles, and thus by flying one stage per day they should be able to reach their destination within the scheduled 30 days.

The third aviator who has entered for the competition is Lieut. Koppen, who proposes to use an Albatros machine.

The distance from Holland to Java is roughly 9,200 miles. Three routes have been mapped out. The start will be made from Soesterberg.

A Handley Page in China

The twin-engine Handley Page aeroplane supplied to China recently made its official test flight with representatives of the Chinese Government on board. The machine left Nanyuan aerodrome with 14 passengers and 1,200 lbs. of sand which acted as test load. The machine so loaded had a total weight of 6 tons. After climbing to 6,200 ft., three circuits of Pekin and the surrounding country were made, the machine diving three times in salute over the President's Palace. The engines and the machine behaved splendidly throughout the flight in spite of the intense cold which prevailed at 6,000 ft. Mr. K. Y. Wei and Gen. Tsing, who represented the Chinese Government on the test, occupied the front seats of the machine, and after landing were enthusiastic over its steadiness and the feeling of security it inspired.

A landing was made in failing light in an aerodrome festooned with Chinese lanterns.

ELEMENTARY AERONAUTICS
and
MODEL NOTES

By John F. McMahon

The Sopwith Triplane Model

The model shown in the accompanying drawing this issue is of the well-known Sopwith Triplane Scout, a very fast and efficient type of machine. There are many reasons why I have selected this machine, but owing to lack of space I will not attempt to give any at this time, but will devote the space to a description of the model.

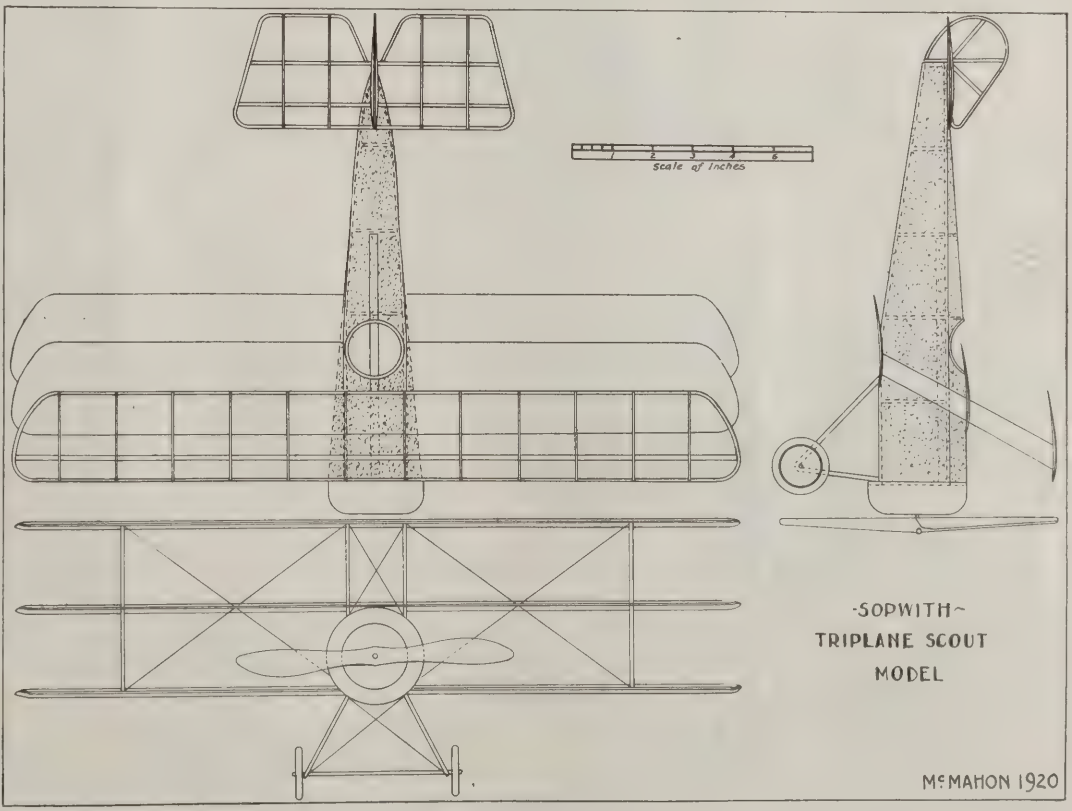
This model, as you will notice, must be made exactly as the drawing shows or it will not fly as one would like, but if the instructions and drawing are followed out to the letter you will have no trouble.

There are a few parts that cannot be made by the beginner, but these can be purchased from the Wading River Mfg. Co. (Their advertisement will be found in the advertising columns.) These people carry a full line of model aeroplane material, as well as the special fittings, dummy rotary motor and motor cowling needed for this model. Owing to the triplane construction, it will be necessary to have these fittings to rig the wings.

When attempting to fly this machine the aeromodelist might have a little trouble at first in balancing the model correctly, which, unless correct, will cause the model to rock or pitch. To correct this the angle of incidence of upper wing must be decreased slightly, but never less than a slight positive angle. This will bring the model up to a correct flying angle.

Now the reader might wonder why I suggest a model that is difficult to fly.

What is to be learned from models that are easy to fly, such as the racing type, which will fly no matter how poorly constructed. In order to find the hidden secrets of aeroplane flight we must try something that requires careful thought to dope out. It will surely be more pleasing to the model flier to build a model of this type and have it prove successful than one that will fly simply because it has a propeller and rubber motor and wings than can be shifted anywhere on the model. Hard work makes for success, and the model builder should bear this in mind when building models. Should this model fly only 100 feet you will learn something that will amply repay you for your trouble in building it. You must remember that we are ready and willing to help you, and parts that you cannot make can be purchased from the company mentioned above.



-SOPWITH~
TRIPLANE SCOUT
MODEL

Fuselage

The construction of the fuselage is almost the same as in previous models except for the fact that a hoop is formed in the nose, to which the engine cowling and the covering is attached. The longerons, struts, etc., are made from ⅛-inch square spruce, glued and nailed together. The hoop in the nose is made of ⅛-inch round reed. The covering, which can be silk or fiber paper, is pasted to the longerons and around the hoop in the nose, which gives the body a round section to a point about midway between nose and tail post. Of course, the motor stick is fastened in place first, as shown, and the dummy motor is also attached to the propeller shaft. Fourteen strands of flat ⅛-inch rubber forms the motor. The motor cowling is then attached to the nose loop, which encloses the engine. The landing chassis is next fastened to the longerons with wire or thread and glue. The landing chassis struts are made of ⅛-inch reed.

The wheels are wood, with rubber tires, and are 2 inches in diameter. The axle is steel rod threaded at each end and nuts fastened to hold wheels on.

Wings

The construction of the wings is the same as for previous models, but there is only one wing spar in the wings. This can be round or square in section, but must not be over ⅛ in. thick.

The bottom wings are attached to the lower longerons. The middle wing is one piece and lays on top of the cowling. The over-body struts pass through this wing and fasten to the upper wing sockets. The outer strut can be made in one section or two, as the reader wishes.

Tail and Rudder

The tail is made in one piece for ease of construction. That is, the flaps are not movable. The same applies to the rudder. These parts are fastened to the fuselage directly, as it is not necessary to have them movable.

Scale Drawings of Well-Known Machines

Many inquiries have been received by the writer as to whether there is a book on the market that contains line drawings of the latest types of big machines. To answer all of these inquiries at once and to help those who wish to procure a book of this kind, I wish to inform the readers that "The Textbook of Applied Aeronautic Engineering," by Mr. Henry Woodhouse has just been printed and is now being distributed to the public as fast as they can be distributed. It would be advisable for readers of this page, who wish to purchase this book to write the Aeronautic Library, 299 Madison Ave., New York City, at once, as the demand is great.

Denver Model Aero Club

Mr. R. H. Pearson, of Denver, Colo., writes stating that the Denver Model Aero Club has disbanded, as he has not the time to devote to models any longer, but will gladly assist any resident of this town who would care to take up the work. He is with the Denver Rock Drill Mfg. Co. of Denver, Colo.

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Profiteering

Ten thousand for an aeroplane
Or more than that is spent,
Which is a lot considering
They make them for ascent.

Speed and the H. C. L.

Lieutenant Papa, Italian aviator, flies 172 miles an hour. American papas have to go something like that to keep ahead of the Cost of Living.—*Akron Press.*

Going Down

Wig—Major Schroeder has been higher, and nearer to Heaven than any other living man.

Wag—Yes, but when last seen he was heading the other way.

Unanimous

The aviator turned to his passenger: "Fifty per cent of those people below think we'll never return alive," he said boastfully.

"That's not all," said the passenger. "Fifty per cent of us up here think so, too."

In the Path of the First Transcontinental Air Derby

(Copyright 1919 —

(Courtesy N. Y. Globe)

Hog ridge, u S A.
Springtime, 1920.

Aerial Age Weakly,
N. Y. New York.
Dere editer:

i seen by yur weakly sum time ago and also now that the govermeant is condukting a investiggation about the de Haviland 4 aereoplane, witch is thot to bee unsaif. In Januwary, 1919, sum time you printed a picture and diskripshun of the abuv naimed machine, whitch I bilt 1 of.

i did not hav, howevur, a libertee engin, so i used 1 off a old Ford witch i bot in a junck shopp. this with a hand maid propeler was putt in the first part of the fusillaig. i then bilt the lattur, yousing been pols four the long stiks and soape bockses split up four the short 1s. The fusellaig wuz knot quitte long enuf, becaws the longst been pol i cood fined wuz onely twentee ft. one and ½ intches long, so i maid it shortur. i also did knot hav any plie would, so i yoused the sides uv a cuple uv eg-krates. i maid the gun-ring owt of a barel hoop, and knot having any masheen gun, putt a shot gun on insted. my kuzin, Eph, sat in the seet & the gun fell on his hed. He got mad & tor the ring owt. sum peeple kant apreshiate anything a fello maiks. the tale wuz maid owt uv kindling would witch i kut two the rite sighs. The wings wuz also maid owt uv kindling would, with been pols for sparrs. i did knot know watt the alerons wuz four, so i did knot youse any. i kuvered it with a lot uv old wal-paiper witch i had in the attik sins 1879, & i thot i would youse it up. this plain wuz bilt in the mowntaines, so it allredy has a altitood rekord of abowt two thowsand ft.

i tryde it owt a kuple of dais ago, & wen i 1st started the moter it turned the propeler and hit me on the hed. after that i got the moter started but the durn thing woodent flie. in conclusion i wish to agree with Edy Rikenbaker, captain Sweeny and uthers: The De haviland 4 is unsaif and know good.

Yurs trooly,
Joseph Aibrahamm Woshintun Irving
(K. C. Leach.)

Flying Police

"Yes, your wushup, I was on duty in Section XII. when I saw the prisoner. He was driving his 'plane at a furious pace and flying on the wrong side of a cloud. Held up my hand to stop him, but he took no notice, and after nearly colliding with a nursemaid on her aerial pram, he crashed right into the doorway of the "Aviators' Rest," causing the same to rock and nearly break from her guys."

—*The Joy-Stick.*

C'est la Guerre

"Look, general," shouted a member of his staff, excitedly. "I think I see an American aeroplane."

"You may be right. I understand we have one over here."

Among other military questions, let us consider whether aeroplanes should come under the head of overhead expenses. —*The Naviator.*

Aircraft Insurance

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Our Aeroplane Department
Solicits Your Inquiries For Rates

All Hazards—Any Location

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WINGS POWER

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AERO
MOTORSOL
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NEW YORK

OIL—ACE
PRACTICALLY PROVEN
ADVOCATING AERO MAIL

If You Want to Fly—
and have it in you—we'll make a pilot of you

Our methods instil confidence from the start. From your first lesson by the Philadelphia Aero-Service School of Flying you know that you are taking the air with the most skilled instructors in the business. You know you are training at a safe field, perfect for the purpose, with the very best, up-to-the-minute plane equipment that money, backed by judgment, can buy.

We have made a master pilot of every student who has entered the school with the real spirit of the great flying game. All you need is a desire to be an aviator, and the common sense to "carry on" as your instructors direct. The rest is up to us—and our record is one hundred per cent with both men and women students.

If we cannot make a flier of you, we frankly tell you so, and refund your tuition — our reputation is at stake.

Our average student is ready to qualify for his International Pilot's License after seven hours in the air. The cost of your tuition is based on the time it takes you to qualify with safety. Our method is the official "All Through" system, by instructors especially trained at Brook's Field.

Lieut. J. R. Diaz, of the Army of Guatemala, sent to us for instruction by his government.

Miss Volora R. Nelson, trained by us, the first woman to obtain an expert pilot's license from the Aero Club of America.

Roy J. Musselman, who left our field to start in business for himself a few days after obtaining his license.

Write for folder describing our methods and tuition cost

PHILADELPHIA AERO-SERVICE CORPORATION
636 Real Estate Trust Bldg.,
Philadelphia, Pa.

BELLANCA

THE BELLANCA C. E.
TWO-SEATER DE LUXE
(ANZANI (45-55 h.p.) RADIAL MOTOR)
REPRESENTS THE ALL-ESSENTIAL COMBINATION:-
SUPER-EFFICIENCY! SUPER-SIMPLICITY!! SUPER-ECONOMY!!!

WHY "BELLANCA"?

AIRCRAFT

Abbreviated Specifications:

Wing Span: 28 ft. Length overall: 18 ft. 6 in. Height overall: 7 ft. 2 in. Weight: 500 lbs. Useful load: 500 lbs. Safety factor: 10. Speed with 45 h.p. (with Pilot only): 100.5 m.p.h. With passenger: 96 m.p.h. Climb (Pilot only): 800 ft. per min. ith passenger 620 ft. Landing Speed: 30 m.p.h. Ceiling: 17,000 ft. Gas consumption per hour: Full Speed: 28 lbs. Economic Speed: 17 lbs. Cruising range: 350-450 miles. Deliveries in order rotation.

MARYLAND PRESSED STEEL CO. (AIRCRAFT DEPT.)
HARRY E. TUDOR, Sales Manager 299 MADISON AVENUE, NEW YORK CITY

(*Continued from page* 220)

Straightforward and simple, consequently easy to produce. All parts of the fuselage are readily accessible, and amply strong enough to withstand the heavy duties of a training machine.

Factors of safety: Front truss, 6; rear truss, 4; top landing, 3½.

General Dimensions

Engine	100 h.p. Anzani
Speed	90 miles per hour
Speed variation	120% approx.
Construction and landing gear	Normal "V" type under-carriage Rubber shock absorbers
Range (full throttle)	180 miles approx.
Range (cruising speed)	220 miles approx.
Maximum safe load	650 lbs. approx.
Weight of machine fully loaded	1,670 lbs.
Factor of safety	6.5
Ratio, useful load to total weight	48%
Span	33' 1"
Height	8' 9"
Overall length	23' 1"
Chord	5' 1½"
Stagger	11½"
Dihedral	4°
Loading	5.3 lbs. per sq. ft.
Personnel required to move on ground	2
Equipment	Rev. Counter Air Speed Indicator Altimeter Cross Level and Gauges (Two sets provided)
Stability of machine	Easy to fly and correct both laterally and longitudinally

The "Wallaby"

The "Wallaby" is fitted with the 375 h.p. Rolls-Royce engine, and has been designed to serve as a commercial vehicle for conveying mails, cargo or passengers.

In the former case arrangements are made for taking 1,500 lbs. of mail or cargo and also one passenger, exclusive of the pilot, petrol being carried for eight hours at a cruising speed of 90 miles per hour.

With pilot and one passenger there is available 35 cubic feet for cargo, which becomes 50 cubic feet in the event of the passenger not being carried.

If used purely as a passenger carrier, accommodation is provided for six persons inclusive of the pilot, four passengers being carried in the center of the machine, and one being seated in the pilot's cock-pit.

In this latter case, gasoline is supplied for a duration of six hours at the above cruising speed, viz.: 90 miles per hour.

The motor fitted is very reliable for use on commercial machines, and with it, the "Wallaby" possesses a very large power reserve, enabling the machine when fully loaded to "take off" quickly, a matter of vital importance on an aeroplane used for commercial purposes which may be compelled to use an unsuitable aerodrome.

The under-carriage is of the "V" type, slung on rubber shock absorbers and, being of sturdy construction, enables the "Wallaby" to use practically any class of ground when landing or taking off.

It is of interest to note the ratio of disposable weight to total weight is in the region of 46%.

General Dimensions

Engine	Rolls-Royce Eagle, 8,350 h.p.
Speed	115 miles per hour
Speed variation	150%
Construction and landing gear	Normal "V" type under-carriage Rubber shock absorbers
Range (full throttle)	500 miles approx.
Range (cruising speed)	700 miles approx.
Maximum safe load	2,300 lbs. approx.
Weight of machine fully loaded	5,200 lbs. approx.
Factor of safety	6.5
Ratio, useful load to total weight	45% approx.
Span	46' 6"
Height	12'
Overall length	28'
Chord	6' 3"
Stagger	3"
Dihedral	2½°
Loading	9.4 lbs.
Personnel required to move on ground	2
Equipment	Rev. Counter Air Speed Altimeter Cross Level Inclinometer Watch Thermometer and necessary Gauges
Stability of machine	Easy to fly and correct both laterally and longitudinally

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Manager Aviation Department

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62 William Street, New York City

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AVIATION DEPARTMENT
280 Madison Avenue
Telephone, VANDERBILT 322

The American-French Aero Exposition, Inc., announces that it has purchased

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15-17 West 44th St., New York **Suite 803-804**

Telephones Vanderbilt 7686-7642 **Cable Adress: AMFREX**

A Word to the Wise Dropped from the Skies

The aeroplane is in itself a novelty. Circular spinning and diving from a machine, when witnessed by an observer, represents a peculiar value, the cause of which it is difficult to describe. Advertising distributed from our aeroplanes is surrounded by an atmosphere of romance sufficient to cause people who ordinarily would not even glance at advertising literature to scramble eagerly in their efforts to secure as many copies as possible. These are taken to their homes and offices, where they are exhibited to visitors as costly souvenirs.

The experience gained while touring some of the Southern States as the Fifth Liberty Loan Circus, demonstrated that "bombs" and dodgers and other advertising material fluttering from the sky into crowds is practical.

From your own experience, you realize that AERIAL ADVERTISING is a striking and efficacious method of presenting your product to the masses, and we have worked out several novelties unique in color and original in design, which will interest you. Compared with the results obtained, our rates are lower than you are now paying for newspaper and magazine space, and we can accomplish your aim efficiently and at less expense than you can do it by any other means.

We have a large staff of aviators and practical men in our employ for the mechanical part of our work, and in addition we have the advertising men and means of making your aerial advertising of extraordinary value. One of our representatives will gladly call upon you and outline our plan, without obligation.

This company maintains a register for Pilots, Aeronautical Engineers, and Mechanics available for aviation companies seeking the services of such. The above are invited to register their name, address, class of work, and salary expected. There is no charge to the companies or those registering for such service.

(*The agency will be glad to hear from aviators and companies, or balloonists who have balloons, available for advertising purposes in any part of the world and who are in a position to undertake and carry out business of this kind. Information in regard to special Aerial Routes in the United States furnished on application to* **prospective advertisers.**)

U. S. Martin Army Transport 12 Passenger Plane

The Difference Will Be Found In The Performance

FOR ten years the Glenn L. Martin Company has been manufacturing Superior Aircraft. An organization of pioneers in the industry, the Glenn L. Martin Company puts the mature technical knowledge born of ten years' experience behind every Martin airplane. The well-known ability of Martin airplanes to deliver maximum performance over an indefinite period of time is proof enough of the fact that

Super-Quality is Built into Every Martin Airplane—
built in with the tools of Experience in the hands of Knowledge.

MARTIN U.S.A.

THE GLENN L. MARTIN COMPANY
CLEVELAND, OHIO
Contractors to the U. S. Army, Navy and Post Office Department
Member of the Manufacturers' Aircraft Association.

(*Continued from page* 214)

"*Provided,* That such arrangement may be made in relation to the purchase of any basic patent connected with the manufacture and development of aircraft in the United States as in the judgment of the Secretary of War and the Secretary of the Navy will be of the greatest advantage to the Government and to the development of the industry;

"*Provided, Further,* That in the event there shall be pending in court litigation involving the validity of said patent or patents bond, with good and approved security in an amount sufficient to indemnify the United States, shall be required, payable to the United States, conditioned to repay to the United States the amount paid for said patent or patents in the event said patent or patents are finally adjudged invalid".

There is evidence that after Congress made the appropriation of $1,000,000 to buy the aero patents, the paid lobbyists of the Manufacturers' Aircraft Association proceeded to circulate reports that the aeronautic industry would not be able to produce more than a few hundred aeroplanes for the first two years and, possibly, a thousand at most the second year. Then these lobbyists suggested to the Government officials that the Government would save money by paying royalties of between $100 and $200 per aeroplane built instead of buying the patents outright.

Statements of manufacturers, members of the Manufacturers' Aircraft Association, were printed in the *Congressional Record* and in newspapers, to the effect that only 10 aeroplanes had been constructed by the aeronautic industry in 1916 and that it would take several years before the manufacturers would be in a position to turn out 1,000 aeroplanes in one year. And it was pointed out that in the meantime the war would no doubt come to an end. Hence these manufacturers seemed anxious to have the Government save money by paying a royalty on each aeroplane instead of having the Government purchase the patents outright.

Nothing was said at this time or at any time until Congress investigated the situation, of the fact that the British Government had succeeded in buying the Wright patents for $75,000 and the Curtiss patents for $20,000, making a total of only $95,000 for the patents held by the Manufacturers' Aircraft Association, on which we find today that the sum of over $2,000,000 has already been paid and the U. S. Government will still have to pay royalties on other aeroplanes manufactured.

The Government officials took for granted the statements of the Manufacturers' Aircraft Association's lobbyists and approved the arrangement whereby the Government paid a royalty on each aeroplane instead of purchasing outright the patents as Congress had directed and for which Congress had appropriated the sum of one million dollars.

As soon as the approval of Government officials was received to the scheme of having the Government pay a royalty on each aeroplane, the same lobbyists who had been crying that the aircraft industry would not be able to produce more than a few hundred aeroplanes, proceeded to shout for large appropriations with which to purchase tens of thousands of aeroplanes.

It is to the credit of the aeronautic industry as a whole that over 15,000 aeroplanes were produced during the war. But it is to the discredit and shame of the lobbyists and the Manufacturers' Aircraft Association that the Government was forced by the Manufacturers' Aircraft Association to pay a royalty on each aeroplane for the use of the patents which the Government probably could have bought for $95,000, which was the sum paid by the British Government.

We are well aware, of course, of the opinion rendered by your predecessor, the Hon. Thomas Watt Gregory, at the time of the formation of this trust, but it is evident that he either did not contemplate the scope of the activities that this association would engage in or that he did not anticipate the decision of the Court in the "Hardwood Lumber Case."

We are independent producers of aircraft. This combination seriously handicaps us and all thers outside its circle, and very materially interferes with the development of the industry in this country.

In view therefore of the "Hardwood Lumber" decision, and of the well-known character of this "Association," may we request you to inform us what action is contemplated by your office?

Very respectfully yours,
CHRISTMAS AEROPLANE COMPANY
WILLIAM WHITNEY CHRISTMAS,
1269 Broadway, New York, N. Y. *President.*

RADIATORS

We manufacture all types.
Curtiss J-N-4's in stock
for immediate shipment.

Send us your inquiries.

Rome-Turney Radiator Company
Rome, N. Y.

(*Continued from page 223*)

Type of balloon and contractor.	Order No.	Number ordered.	Number delivered.	Total disbursements.	Are disbursements completed.	Does order include spares.
Observation balloon from inflation tube stock:						
Goodyear Tire & Rubber Co.	320034	1		No payments.	No	No.
Dilatable Type R. D. L. Observation:						
Goodyear Tire & Rubber Co.	721078	2	2	$13,400.00	Yes	No.
Julliott observation:						
B. F. Goodrich Rubber Co.	8718	1	1	6,000.00	Yes	No.
British type XX-I. Airship:						
Conn. Aircraft Co.	721089	1		No payments.	No	No.
Airship, single motor Type F. C:						
Goodyear Tire & Rubber Co.	721065	1	1	40,000.00	Yes	No.
Propaganda:						
Goodyear Tire & Rubber Co.	21252	3	3	1,856.66	Yes	No.
Do	720627	50	50	16,250.00	Yes	No.
Edw. S. Halsey	21251	3	3	1,185.24	Yes	No.
Scott, Omaha T. & A. Co.	720600	150	150	16,641.17	Yes	No.
Do	21415	8	8	1,388.54	Yes	No.
Do	21250	3	3	550.00	Yes	No.
Experimental cotton propaganda:						
Columbia Mills Co.	720543	1	1	60.00	Yes	No.
Total			218	37,931.61		
Type R observation:						
Conn. Aircraft Corporation	20526	10	10	74,744.32	Yes	No.
Do	21362	25	25	169,934.00	Yes	No.
B. F. Goodrich Rubber Co.	20527	50	50	89,250.00	Yes	No.
Do	20018	100	56	137,400.00	Yes	No.
Do	20912	118	118	1,475,067.58	Yes	No.
Goodyear Tire & Rubber Co.	20528	100	100	562,552.88	Yes	No.
Do	20908	450	371	2,923,139.89	Yes	No.
Do	20082	50	50	372,500.00	Yes	No.
Do	8917	4	4	30,716.30	Yes	No.
A. Roy Knabenshue	21032	25	25	191,205.66	No	No.
Navy Department	720720	44	44	70,000.00	No	No.
United States Rubber Co.	20932	37	37	422,252.68	Yes	No.
Total			890	6,518,763.31		
Experimental observation:						
B. F. Goodrich Rubber Co.	8717	1	1	6,000.00	Yes	No.
Conn. Aircraft Corporation	5818	1	1	5,500.00	Yes	No.
Total			2	11,500.00		
Type M observation:						
Goodyear Tire & Rubber Co.	8714	1	1	6,179.65	Yes	No.
Do	8917	15	11	76,494.86	Yes	No.
B. F. Goodrich Rubber Co.	8916	9	9	54,000.00	Yes	No.
Conn. Aircraft Corporation	20501	1	1	8,000.00	Yes	No.
Total			22	144,674.51		
Type C observation:						
Goodyear Tire & Rubber Co.	7916	11	5	22,500.00	Yes	No.
Do	5815	2	2	8,200.00	Yes	No.
Total			7	30,700.00		
Supply:						
Conn. Aircraft Corporation	20056	5	5	11,500.00	Yes	No.
Do	20059	50	50	79,125.00	Yes	No.
Do	720342	14	14	17,990.00	Yes	No.
Do	720606	28		1,053.76	Yes	No.
Do	720646	12		1,007.02	Yes	No.
Do	10264	3	3	1,000.00	Yes	No.
Firestone Tire & Rubber Co.	720293	10	7	76,223.56	Yes	No.
Do	720607	21			Yes	No.
B. F. Goodrich Rubber Co.	720214	10	10	12,090.00	Yes	No.
Goodyear Tire & Rubber Co.	20058	29	29	40,600.00	Yes	No.
Do	9525	5	5	7,000.00	Yes	No.
A. Roy Knabenshue	720608	1	1	1,146.00	Yes	No.
Total			124	248,735.34		
Pilot:						
Faultless Rubber Co	71910	576	576	$43.00	Yes	No.
Sterling Rubber Co	20603	2,000	2,000	2,020.00	Yes	No.
Do	73625	6,500	6,500	6,715.00	Yes	No.
United States Rubber Co.	21265	6,000	6,000	5,500.00	Yes	No.
Do	870196	400	400	500.00	Yes	No.
Total			15,476	14,783.00		
Pilot:						
Faultless Rubber Co	20633	2,500	2,500	175.00	Yes	No.
Do	20862	575	575	40.25	Yes	No.
Do	20863	575	575	40.25	Yes	No.
Do	20993	10,000	10,000	700.00	Yes	No.
Do	21122	4,608	4,608	322.56	Yes	No.
Do	72738	4,032	4,032	282.24	Yes	No.
Revere Rubber Co	71983	2,275	2,275	2,030.63	Yes	No.
Total			24,565	3,590.93		
Spherical, free:						
Goodyear Tire & Rubber Co.	721044	20	20	24,662.95	Yes	No.
Conn. Aircraft Co	721043	16	16	15,100.00	Yes	No.
B. F. Goodrich Rubber Co.	710265	3	3	600.00	Yes	No
Goodyear Tire & Rubber Co.	710266	3	3	70.00	Yes	No
Do	9525	2	2	8,000.00	Yes	No.
Conn. Aircraft Corporation	20706	2	2	4,760.00	Yes	No.
Goodyear Tire & Rubber Co.	5815	2	2	5,125.00	Yes	No.
Do	8851	1	1	1,340.00	Yes	No
B. F. Goodrich Rubber Co.	8970	1	1	7,846.36	Yes	No.
Conn. Aircraft Corporation	8391	1	1	3,750.00	Yes	No.
French-American Balloon Co	8371	1	1	1,800.00	Yes	No
Do	9769					
A. R. Knabenshue	8361	1	1	4,200.00	Yes	No.
		1	1	1,950.00	Yes	No.
Total			54	79,204.31		
Grand total all balloons and airships.				7,149,283.01		

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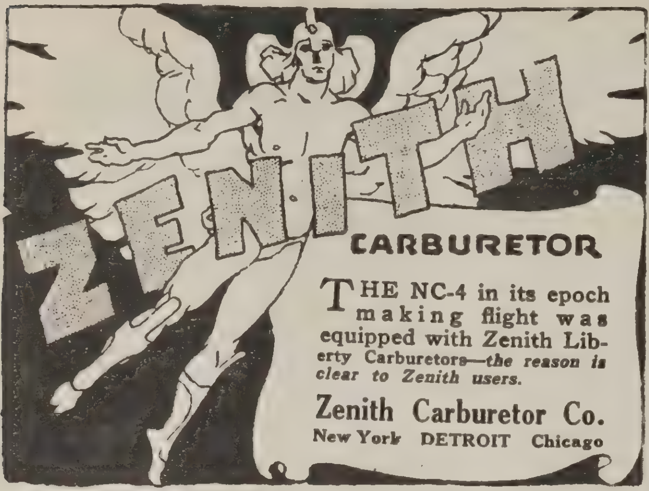

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WEEKLY

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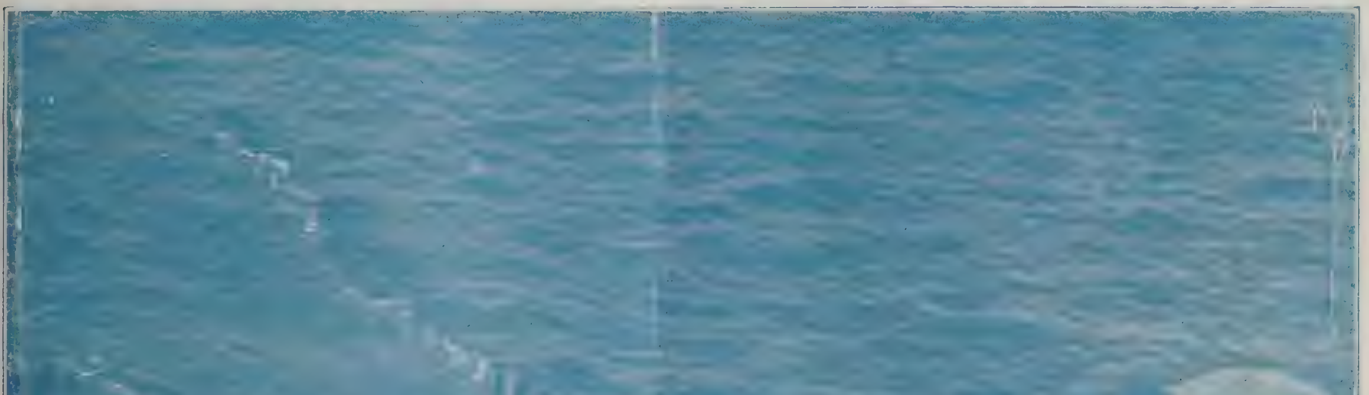

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LISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
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AERIAL AGE
WEEKLY

VOL. XI. MAY 3. 1920 NO. 8

TABLE OF CONTENTS

PAGE
If You Expect Any Miracles in 1920—You Have Got to Help Perform Them 247
Navy Department to Have Extensive Exhibit at Atlantic City 248
The News of the Week 249
The Aircraft Trade Review 251
U. S. Aerial Mail 252
The Orenco Type "F" Tourister Aeroplane 253
Pioneer Aircraft Instruments 257
Recent Aero Patents 259
Warping of Aircraft Propellers 259
Report on Latest Congressional Investigation of Billion Dollar Aircraft Expenditures 260
Naval and Military Aeronautics 261
Foreign News 262
Elementary Aeronautics and Model Notes 263
Aeronitis 264

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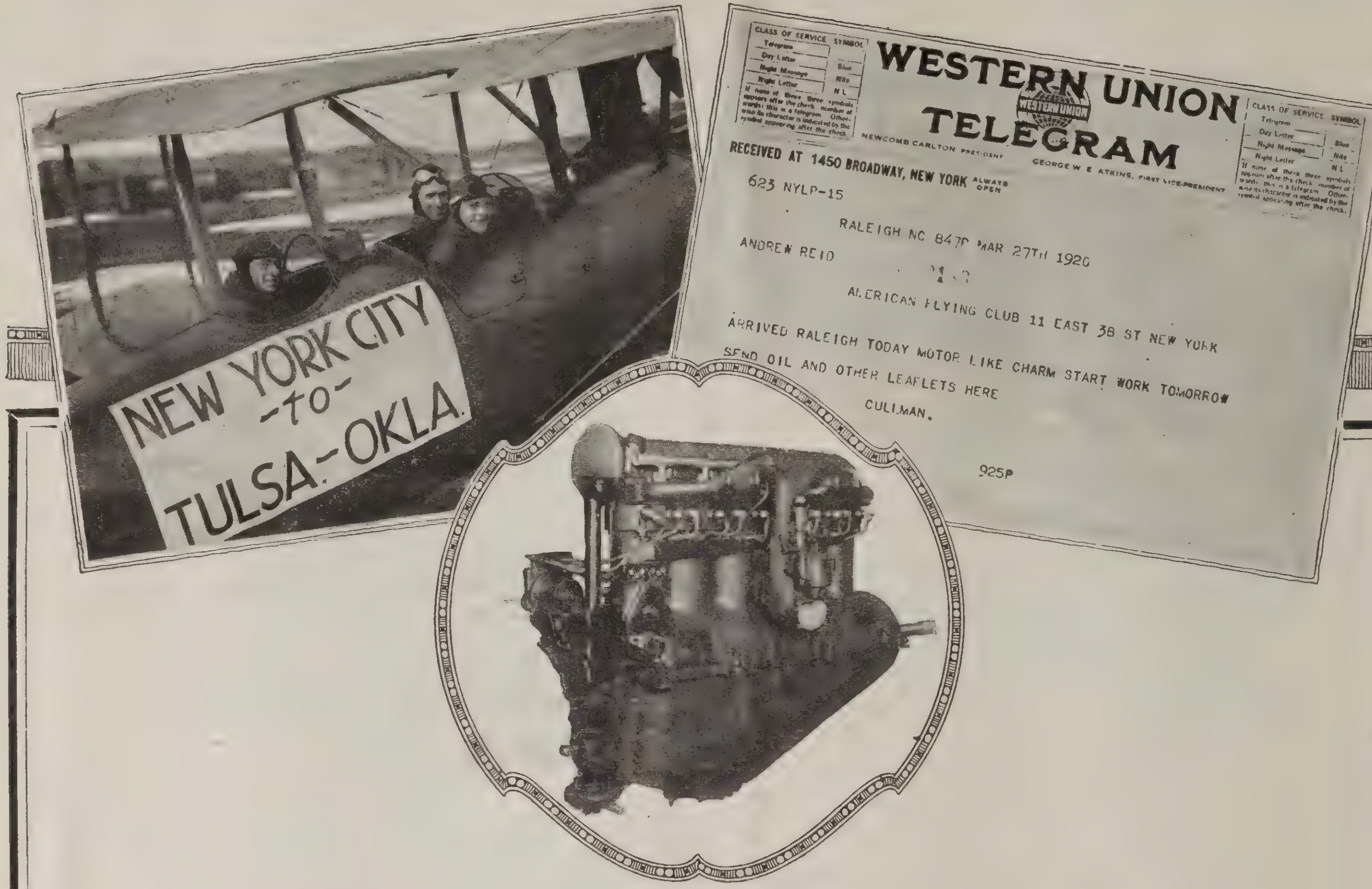

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New York to Raleigh-700 miles by airline-"Motor worked like a charm"

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VOL. XI. NEW YORK, MAY 3, 1920 NO. 8

IF YOU EXPECT ANY MIRACLES IN 1920—*YOU* HAVE GOT TO HELP PERFORM THEM

At this time last year people said that aviation was dead and it was silly to think of reviving it. When we told people that our records showed that several thousand inquiries from organizations and individuals who were ready to buy aeroplanes for transportation, sport, pleasure, advertising, surveying, and the several hundred purposes for which aircraft have been used since, we were told that we were dreaming.

When we figured the lowest average of possibilities and stated that at least five hundred aeroplanes would be bought in a year, we were pronounced "crazy."

Fifteen Million Dollars' Worth of Aeroplanes Already Sold for Civilian Purposes

Now we are told that we were really conservative in our enthusiasm, and some state that we performed a miracle.

Over four thousand aeroplanes have been sold during the past twelve months, though only half this number have been delivered, notwithstanding the obstacles put in the way of progress by the employees and a few illadvised members of the Manufacturers' Aircraft Association, who, as shown by the congressional reports, tried to prevent the progress of civilian aeronautics.

These very few individuals who represent only a fraction of the firms in the aeronautic industry, wasted their time in pernicious lobbying to get government subsidies and, as the evidence clearly shows, conspired to prevent civilian aeronautic activities.

Fortunately progressive firms like the Curtiss Corp., the Interallied Aircraft Corp., the Nebraska Aircraft Corp., the Martin Corp., went ahead and helped to perform the so-called miracle which is putting American aeronautics on a self-supporting basis independent of government business.

It Is Up to You to Help Perform Miracles in 1920

As the popular "Syd" expresses it in the *American Magazine*, "If you expect any miracles in 1920 you have got to perform them." At all events you have to help perform them, or else you will sidetrack yourself, as those who did not participate in performing the so-called miracle of the past year, which saved the aeronautic industry.

Some of "Syd's" philosophy will help the aeronautic movement at this time. Here is what he says about performing miracles:

"The New Year is at hand. But January 1st and the days to follow will be no different from December 31st and the days behind, unless *you* make them different.

"One of the silliest of human delusions is the idea that time will bring everything out all right. Haven't you heard people get that off—and then proceed to do nothing whatever with time? The most pitiable business failure I know of was due to a self-deluded individual in the concern who did nothing but counsel the great things that time was going to do for the business. "Just wait," was his advice. 'What we need is time. Leave it to time.' So they did. And in time the business decayed.

"Foolish people leave all sorts of things to time. Some leave the question of ill health to time. Others leave the question of thrift to time. Only today I heard of a twenty-five-thousand-dollar-a-year man, right here in New York, who at fifty is spending every nickel he makes—saving nothing. I suppose he thinks that God cares for the ravens, and that God will take care of him. God *will* no doubt care for him—just as He cares for the ravens. But ravens don't live until they lose their jobs because of old age. Neither do they require steam-heated apartments, underclothes, and hair mattresses to sleep on.

"Another most interesting case of leaving a thing to time has just come to my attention. A certain man in these United States, who thinks he is going to be nominated for the Presidency next June, regards himself as a 'man of destiny.' To his intimates he thus refers to himself. But he is doing nothing to *prove* himself a man of destiny. His friends are getting nervous. They think that he ought to get up and start something. They are beginning to fear that he is destined to remain permanently seated in a rocking chair.

"Left to itself, time is nothing but a grand little passer. Look how it passes in the desert and in the Arctic Circle. Plenty of time—but no potatoes.

"Don't leave anything to Father Time. He won't do anything for you. He can't. All he does is to provide you room in which to perform. If you sit in the corner and wait for him to do your job, you'll be disappointed.

"Father Time is only a sort of janitor in the employ of the Almighty. He sees the tenants come and go. But he has nothing to do with any of them, cares nothing about them. When you enter the arena he may bow and say, 'Good morning.' When you check out seventy or eighty years later he may say, 'Good night.' That, however, will be the extent of his interest in you, or knowledge of you. He sees billions pass in and out the gate—dunces, mediocres and bright boys like Cæsar and Willie Shakespeare. But they all look alike to him."

We endorse Syd's sentiment in every way!

NAVY DEPARTMENT TO HAVE EXTENSIVE EXHIBIT AT ATLANTIC CITY

Various Exhibits to Cover Forty Thousand Square Feet — Many Surprises — Large Attendance Assured

THE Navy Department is to have an extensive exhibit at Atlantic City, during the Third Pan-American Aeronautic Congress, May 20 to May 30.

The Exhibit will be under the direction of the Board of Survey, Appraisal and Sale, which has charge of selling surplus naval aeronautic equipment.

Commander J. D. Robnett, in charge, has written to the Aero Club of America, regarding the naval exhibit, as follows:

BOARD OF SURVEY, APPRAISAL AND SALE
Fourth Naval District
Navy Yard, Philadelphia, Pa.
April 12, 1920.

The Aero Club of America,
297 Madison Avenue,
New York City, N. Y.

Sirs:

It is desired to report that Lieut.-Commander H. K. McCay (CC) USNRF., has been placed in charge of the Navy Exhibition of Aircraft, motors, instruments, and other surplus aircraft material, which the Navy has for Sale. This exhibition is to be held on the Steel Pier, Atlantic City by the Aeronautic Congress from May 20 to May 30, 1920.

This Board desires to obtain the very best location available for the exhibition of this material, as it is desired by this Board to secure as many sales from civilian interests in Aeronautics as possible. This Board, thru this officer, has just made a large sale consisting of six F5L Hydroplanes, and he is thoroughly familiar with the surplus material that the Navy has on hand.

It is, therefore, requested that you forward at once to this Board a plan of the proposed space on the Pier, together with any suggested location for our exhibit. Arrangements will immediately be taken in hand for seting up this exhibition which is purposed to be made one of the most attractive that can be arranged in the short time available.

Respectfully,
J. D. Robnett
Commander (SC) USN.
H. K. M.
By: H.K.McC.

Seaplanes, Motors and Equipment at Bargain Prices—Aero Clubs, Manufacturers and Sale Agents Invited to Bid.

Aero clubs, aviators, manufacturers, sale agents and people planning to use seaplanes for sport, pleasure and transportation are invited to visit the Naval Exhibit and bid on the equipment which is offered at bargain prices.

The amount of equipment available will only meet a fraction of the demand for seaplanes to be expected this summer and this opportunity to purchase at bargain prices must not be overlooked.

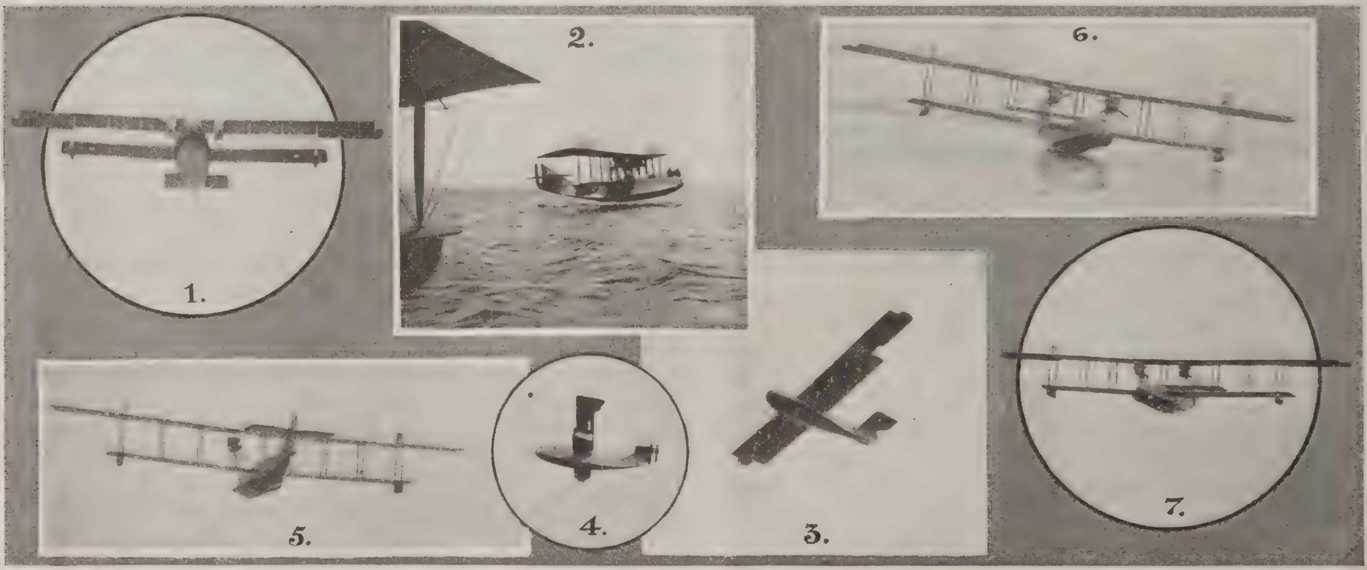
The exhibits already decided will cover forty thousand square feet of space on the Atlantic City Steel Pier, where the Exposition and Congress will be held. There are a number of attractive surprises which we are not at liberty to announce at this time, but which will be of great interest to the aeronautic movement and especially to prospective aircraft buyers.

It is interesting to note that two firms going into transportation of passengers and express have bought F5L seaplanes from the Navy Department of late.

The F5L flying boat is a biplane tractor with two Liberty motors and is essentially the same as an H16 flying boat, but slightly larger. The number of the crew and their disposition are the same as in the H16 flying boat. The wing spread is 104 feet, and the total area, including ailerons, is 1,397 square feet. The ailerons and rudder are balanced as shown in the photographs. The weight, light, including instruments and water, is 8,250 pounds, and the total weight is 13,000 pounds when fully loaded. The full-load draft is 27 inches.

The maximum and landing speeds are 87 and 57 miles per hour, respectively, and the climb is 2,625 feet in 10 minutes. The endurance at full speed is 5.5 hours and at cruising speed 7.9 hours.

This type of flying boat is manufactured by the Naval Aircraft Factory, Philadelphia, Pa.; Curtiss Aeroplane & Motor Corporation, Buffalo, N. Y.; and the Canadian Aeroplanes (Ltd)., Toronto, Canada.



Views of the twin-motored F5L Seaplanes to be exhibited at the Atlantic City Exposition during the Third Pan-American Congress

THE NEWS OF THE WEEK

Pass Bill for New York City to Give Land to U. S. for Aerial Stations

Albany, N. Y.—The Assembly has concurred with the Senate in the passage of the Karl bill to authorize New York City to cede to the United States free of cost the city's interests in land required for the establishment of aerial stations in connection with the defense of New York harbor and the Atlantic coast. The measure will go to the Governor.

Spokane to Have Two Flying Fields

Spokane, Wash.—This city is to have two standard landing fields. The Russell-Symons Aviation Company's ground has been standardized for six months and has been in daily use throughout the winter. A four-machine hangar and repair shop is in operation. The company operates a Curtiss Oriole, a JN-4 and a Standard Curtiss-engined machine. The city's Parkwater field is being placed in condition for landing under all conditions. This is the original flying field in Spokane and has been used by government flyers.

The municipality has undertaken initial improvements at the field, and it is being utilized by The Spokane Aviation Company, just incorporated by W. T. Barnard, N. Barnard, D. Matthews and T. D. Matthews.

William Burk, a student aviator, recently established an altitude record for Spokane by reaching the 10,300 foot level.

A three-passenger flying boat will be operated from Liberty Lake, ten miles east of Spokane, by the Russell-Symons company this summer.

Japanese General Flies With American Officer

Distinguished Japanese visitors at Mitchel Field, Mineola, were entertained recently by one of the best flying exhibitions, aviators at that field have shown this spring. Capt. Toga and Major Itoh, attaches of the Japanese army in this country, took the guests out.

Lieuts. J. E. Wright, C. L. Midkiff, John P. Roullot, R. D. Kirkpatrick, H. D. Norris and W. E. Richards did stunts singly and in squadron for the better part of an hour.

Capt. Harry Smith took up Lieut. Gen. Gaishi Nagaoka of the Japanese army in a De Haviland 4B. The general expressed delight and it was said to be his first trip.

Use Planes to Aid Salvation Army Drive

Salvation Army literature, prepared for the National Home Service drive next month, but kept from distribution among workers at Albany and Buffalo by the tieup of freight service, was whisked to its destination by aeroplanes.

The 500 pounds of booklets and other material was divided between two De Haviland planes at Mitchel Field, Mineola, and delivered upstate in a short time.

Plan Aero Club at Pensacola

A campaign for an Aero Club to be organized in Pensacola, Florida, has been started by Chief Petty Officer L. E. Coombs, of the Pensacola Naval Air Station, managing editor of *The Naviator.*

This club will comprise many of the pilots and aviators of the naval air station, prominent and progressive business men of Pensacola and also the city officials, who will work with the object of promoting an aerial mail and transportation service for the city.

Navy Dirigible Will Make Non-Stop Flight

The U. S. Navy dirigible of the nonrigid type, the C-6, will shortly start on a long distance flight. This airship, the only one of its kind on the Pacific coast, will essay to fly from San Diego to San Francisco in a one-day, non-stop flight.

At the present time the big ship is laid up undergoing repairs due to defective control surfaces. Entirely new surfaces are being substituted in place of the old ones. The task of overhauling the plane surfaces will require considerable time, possibly three weeks or more, and necessarily delay the proposed flight.

The plan for the dirigible trip to San Francisco originally had for its purpose an exhibition of the big airship at the first San Francisco Aeronautical Show. This plan had to be somewhat altered, however, owing to the damaged condition of the control surfaces.

The Navy Department has authorized that the C-6 make the flight, upon recommendations submitted by the commanding officer of the San Diego station. The landing in the north will be made either at Golden Gate Park or on the aviation landing field on the Marina.

After a brief stay the return trip will be made. This will include two stops, one at Santa Barbara and another at Los Angeles. A working force will be sent along ahead of the dirigible, to assist in landing the ship. About 300 men will be required for this work, and will precede the airship to San Francisco and thence depart for the two stopping places designated for the return flight.

The department has suggested that a visit be made to the Navy Yard at Mare Island, as a means of ascertaining the practicability of landing there. The C-6 will be commanded by Lieut. R. J. Miller, with Lieut. Ralph Norris, Lieut. Peck and Lieut. Hollsworth as pilots, and Chief Machinist Mate Downs and Chief Clark as radio operator.

Aviators' Cooperation Requested

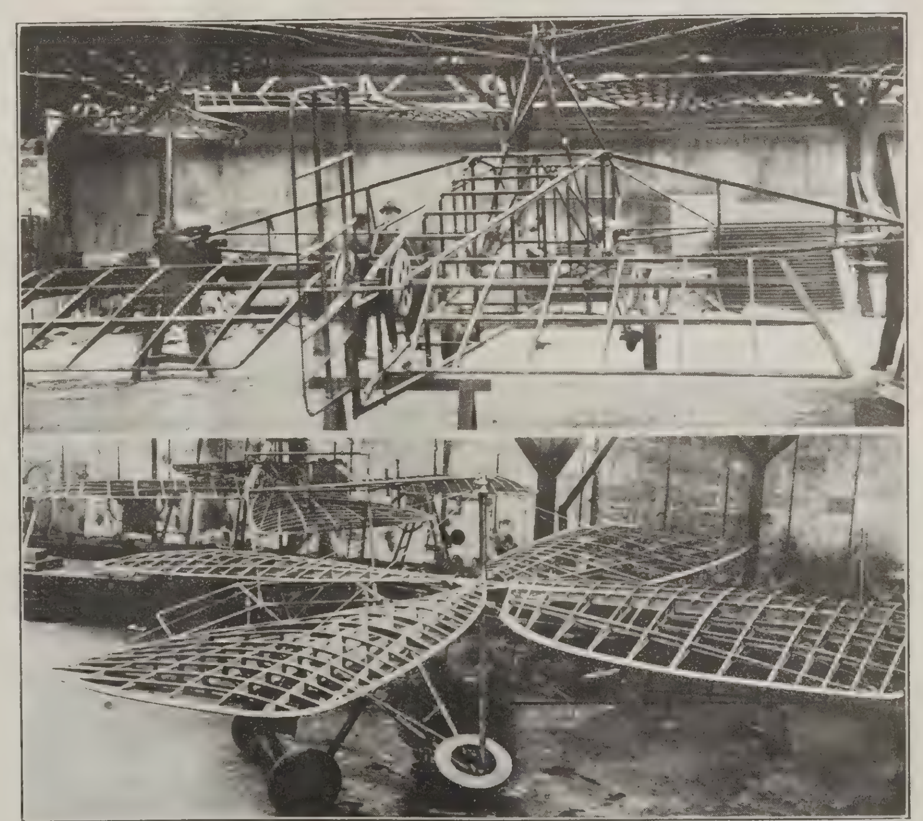
The Weather Bureau of the U. S. Department of Agriculture has requested AERIAL AGE to invite the cooperation of aviators in collecting accurate meteorological information.

A committee has been formed to increase aviators' knowledge of meteorology, particularly of those conditions which most affect the flight of aeroplanes. The data thus secured will aid in the selection for aerial travel of the best regular routes, flying levels and landing fields or bays.

Any unusual experiences with high velocity winds or unusual air currents should be sent to Col. C. C. Culver, Vice-Chairman of the Committee on Aeronautical Meteorology, Air Service Department, Washington, D. C. The other members of the committee are:

Committee.—Major General C. T. Menoher, Air Service, Washington, D. C.

Col. C. C. Culver, Headquarters U. S.



New Aeroplane which can rise and descend vertically. The Alerian, with reversible wings, invented by Prof. La Cointe and Engineer Louis Demblanc of France. The State of France has contributed 100,000 francs to help the inventors to perfect the machine

Air Service, 7th and B Streets, N. W., Washington, D. C. [Vice-chairman.]

Lieut.-Col. W. R. Blair, Meteorological Service, Signal Corps, Washington, D. C.

J. G. Coffin, Research Dept., Curtiss Engineering Corporation, Garden City, L. I., N. Y.

Ford A. Carpenter, Dept. of Meteorology and Aeronautics, Los Angeles Chamber of Commerce, Los Angeles, Calif.

J. C. Edgerton, Aerial Mail Service, P. O. Dept., Washington, D. C.

W. R. Gregg, Weather Bureau, Washington, D. C.

Lieut. C. N. Keyser, U. S. N., Room 1905 Navy Bldg., Washington, D. C.

Alexander McAdie, Harvard University, Blue Hill Observatory, Readville, Mass

Newark Adopts Aeroplane Ordinance

Aviators who desire to fly over Newark, N. J., will have to abide by the following regulations or pay $100 fine for the first indiscretion and $200 for each subsequent one, if they are caught.

They must not fly over the central portion of the city, or lower than 4,000 feet, or drop articles from the plane without a special permit.

Stunt flying or exhibitions without a police permit is prohibited. At night each machine must carry lights, fore and aft.

All these regulations are contained in an aeroplane ordinance passed recently by the Newark City Commission. It applies to aeroplanes and balloons. The ordinance was the result of agitation aroused by frequent accidents.

A $1,000 bond must be filed to insure observance of the regulations.

International Aircraft Corporation Establishes Airport

Pleas for a municipal aerodrome having failed, the International Aircraft Corporation of Boston, has taken the initiative among aeroplane dealers and established an eighty-acre airport at Weston, a few miles outside of the city. It is the largest flying field throughout New England. The first hangar has been completed and a corps of workmen have been engaged in felling trees and levelling ground adjoining the aerodrome.

The International is a new corporation, representing the Interallied Aircraft Company in the New England territory. Already orders are being filled for the Avro plane which is much in demand throughout this section. Lack of landing fields and the rugged country to be found in New England has made it essential for pilots to demand planes of the Avro type that can get off the ground easily and land in a comparative small area.

One of the first exhibitions arranged by the International after its incorporation was a midwinter flight when all other means of transportation was practically stalled after successive blizzards. They piloted an Avro, equipped with skiis from New York to Boston, landing on the Charles River in the latter city. Scores of flights were made over Boston to demonstrate that planes can fly regardless of snow drifts.

Fliers throughout the East are extended an invitation to visit Boston and land at the International aerodrome. A thirty-foot white circle will mark the field and on the hangar roof can be seen another circle with the lettering I. A. C. Repair shops are under construction where pilots can have every possible service from gas oil to a new propeller or a plane.

The Aero Club of Massachusetts, composed of 400 former military and naval aviators, have been invited to establish their home at this field.

To Fly From St. Petersburg, Fla., to Springfield, Mass.

After a successful winter season carrying passengers at St. Petersburg, Florida, J. Harry Allen and Ensign Lewis, pilot, are starting in Curtiss F. flying-boat on a trip to Springfield, Mass.

They plan to fly from St. Petersburg to Jacksonville, Florida, across the land and then follow along the coast up to New York.

They are carrying a letter from Mayor Lang of St. Petersburg, Florida, to Mayor Arthur Adams of Springfield, Mass. During their stay at St. Petersburg, they carried on a great business of passenger-carrying and stunt work.

The Prototype of the Aeroplane?

A unique series of experiments has recently been made at the flying school of the Philadelphia Aero-Service Corporation, covering the flying ability of ordinary domestic fowls at high altitudes. In each case the fowl was launched from an aeroplane 2,500 feet above the ground, with the engine idling so as to avoid the wash of the propeller. Of the four kinds of fowls experimented with, the chicken was the only one that did not land safely.

Guinea hens and geese took to wing immediately and made their landings safely at a considerable distance from the launching point. It remained for the duck, however, to prove himself the real super-aviator of the quartet. Nosing down with his wings at rest, he made almost a vertical dive to within five hundred feet of the ground, at which point, he brought his wings out gradually and leveled off, side slipping into his own barn yard and making a beautiful two-point landing.

Chief Engineer Davis remarks that while the eagle might be a model for an orinthopter, all nature needed to do was to provide the duck with an engine and propeller to make it the real aerial king.

Curtiss Commences Instruction Season

With the opening of the flying season, the Curtiss Aeroplane and Motor Corporation has announced the resumption of flying operations at three fields—Garden City, Buffalo, and Atlantic City.

Reed E. Davis and Noel E. Bulloch, pilots for the Superior Fliers Aircraft Co. of Painesville, Ohio

C. S. Jones, former air service pilot, who is in charge of the department of operations, announced that the indications point to a greatly increased activity and interest this year.

The Curtiss school will be located at Garden City, Long Island, and will be under the direction of Richard H. Depew, Jr., who was in charge last year. One of the early American pilots, Mr. Depew, has had several years experience in instruction work. His flying experience dates back to 1911, when he went to France and took up aviation at the Farman school. Later he attended the Curtiss school at Buffalo, N. Y., after which he took up instruction work at Newport News and Miami. During the war he served as test pilot at McCook Field, Dayton, Ohio

Courses in motor and plane construction and repair and theoretical courses in elementary aerodynamics, cross country flying, instrument reading, etc., will be given in addition to actual instruction in flying. The proximity of the Curtiss plant will give students an additional advantage of getting an insight into the actual construction of aeroplanes and flying boats.

Mr. Depew will be assisted by W. H. McMullen, formerly of the U. S. Air Service, and by C. H. Warner, who will instruct in aeroplane mechanics.

The Curtiss Company has fixed a new schedule of rates. Five hundred minutes instruction will be given for $400. If, at the completion of this time the student is ready and desires to take the Aero Club license tests which, under the present ruling, require slightly over two hours, this additional time will be given for $100.

If the purchaser of a machine desires to learn to fly on his own machine, the Curtiss Company will give him this instruction, furnishing oil, gas, pilot and use of field and hangars at the rate of $20 per hour.

If, at the completion of the course, the student desires to take a machine for short rides around the flying field to perfect himself in flying, the Curtiss Company will furnish the machine at the rate of 75 cents per minute for time in the air, provided the student takes some means to insure the company against loss in case of breakage.

The Buffalo school will be located at Kenilworth Field, and Leo Chase, ex-army pilot, will have charge of instruction. The same courses will be given and the rates will also be the same as those in effect at Garden City. The Curtiss factory, where all the Orioles and motors are built, will also be available for observation of construction and assembly.

The Curtiss Flying Station at Atlantic City, which had a successful season last year, carrying several hundred passengers and in providing facilities for instructing a large number of students in flying boat operation, is again open and under the direction of H. R. Walrath, Manager. Last year the Atlantic City station was used exclusively as a water flying station, but it has now been enlarged in scope to include instruction on land machines. The acquisition of the Airport gives the Curtiss Company a large landing field, which will be used this year for school and passenger-carrying work. A. L. Allan, another pioneer flyer, will be in charge of instruction work.

The AIRCRAFT TRADE REVIEW

N. E. J.

Makes Delivery of Windows By Air

Robert M. Cochrane, an aviator of Inavale, Nebr., who does commercial flying successfully delivered a set of windows from Red Cloud, Nebraska, to a farm west of Inavale with his Curtiss J-N 4 plane.

Lieut. Cochrane is an experienced flyer and has made many flights throughout western Nebraska, Kansas, and in Colorado for commercial purposes.

Automotive Engineering Office Opened in Washington

Archibald Black, formerly of the Navy Department, and his brother, Donald R. Black, have opened an office in the Evening Star Building, Washington, D. C., under the firm name of A. & D. R. Black. Both of the brothers have been actively engaged in aircraft engineering work for several years past and have also followed the developments in light motor vehicles.

The firm plans to handle two general classes of work, first, consulting engineering on aircraft and light motor vehicle problems and, second, the technical representation of manufacturers in the automotive field in dealings with the Government Departments.

Aeroplane Dealers Granted Charter

Memphis, Tenn.—The Aeroplane Dealers' Association of America was granted a charter of incorporation recently. The purpose of the organization, as stated in the charter, is to promote aerial sports. The incorporators are: Andrew J. Donelson, G. G. Garrison, John L. Day, J. S. Marriott and John D. Martin. The organization has no capital stock.

Ship Paint from Factory by Aeroplane

Testing the practicability of the aeroplane to solve transportation problems, the Cook Paint and Varnish Company, Kansas City, recently made a rush shipment of paint and varnish by aeroplane from their factory at North Kansas City, to their branch store in Omaha, Nebraska.

The trip was occasioned by the strike of the switchmen, which greatly hampered shipments of paint, varnishes and oils, and was made in the nature of an experiment.

The flight was made in less than two hours, leaving Kansas City, at 11:30 A. M., arriving at Omaha, Neb., 1:29 P. M., covering over 200 miles, at more than 100 miles an hour.

The machine, a Curtiss JN with a 90-horsepower OX-5 motor, was painted with Cook's products in gold and aluminum. Sam. Pickard ,an ex-army aviator, was the pilot.

Providence Has Aerial Photographic Company

The National Aerial Photographic Survey Company has been organized in Providence, Rhode Island, and is planning to engage in the business of aerial photography, aerial mapping and surveying, advertising and transportation.

The officers of the corporation are as follows:

President, R. B. Weeden; Vice President, Thomas Durfee; Secretary and Treasurer, Walter B. Griffin, and General Manager, Edward P. Brennan.

The Aeroplane as a Municipal Vehicle

A call for bids by the Supplies Committee of the Board of Supervisors of the City and County of San Francisco on an aeroplane for use by Treasurer John E. McDougald in the Treasury Department, is the latest announcement showing the progress of aviation.

This particular plane is to be used for taking the pay roll from the City Hall, San Francisco, up to the High Sierras, journeying from the different locations at the various tunnel-mouths, sawmills and dam-sites, as well as to the men at outlying points at Lake Eleanor and Hetch Hetchy proper. At the present time it is a long journey by boat, train, motor and car, involving a tremendous outlay of both transportation facilities and time, but which can be done by an aeroplane in a day, and a return made to the city on the same day.

The Fowler Airplane Company has offered an Avro, with full equipment for using the plane as a field office.

The matter is in the hands of the Supplies Committee and they are expected to decide on a type of plane soon.

Weaver Aircraft Company's Parasol Monoplane

The Weaver Aircraft Company of Lorain, Ohio, is marketing a single-seater Parasol Monoplane which has all the qualifications of the much discussed "Ford of the Air."

The designers are Elwood J. Junkin and Clayton J. Brukner who have for several years been developing low-powered aeroplanes of both land and water types.

This Sport Plane has been designed to have a quick get-away, fast climb, and at the same time, light weight, the ability to glide at a flat angle and low landing speed. The parasol wing gives the pilot an unexcelled range of vision, a feature especially desirable in a sport plane.

Careful attention has been given to all details as dictated by the latest research and accepted good practice. The entire machine is simple in construction, which reduces the cost to the manufacturer and brings the selling price within the reach of the average sportsman. As to rigging, the machine has been designed so as to require practically no attention after leaving the factory. This has been done by replacing the usual wire bracing with quick detachable steel tubes, which add materially to the strength of the panel assembly.

The panels embody several features which simplify production and make for extreme strength and light weight. The wing curve is the U. S. A. 4.

The fuselage is of ply-wood construction throughout, eliminating all wires and fittings, as well as the customary fuselage cover. The stick control is used and lateral control is obtained by warping the wings. The elevators are actuated by means of a steel tube from the control stick to a lever inside the fuselage projecting downward from the center of the member forming the elevator leading edge.

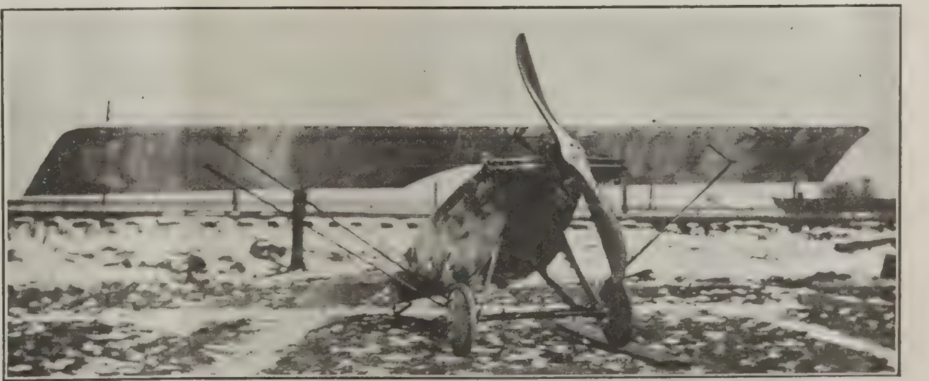
The landing chassis consists of two five-ply laminated streamline struts. Rubber shock absorbers bind the axle to the struts.

The empennage group is composed of a non-lifting fixed stabilizer to which are fastened the elevator flaps. The attachment of the stabilizer is such that it is easily detached. The rudder is balanced and is of sufficient area to insure complete control in handling the machine on the ground.

The power plant is a 30 H. P. two-cylinder Marble engine, the weight of which is only 128 pounds complete with a 6 foot diameter, 4.75 foot pitch propeller, which it turns at 1,450 R. P. M.

The following specifications reveal the details of the little plane:

Overall span, 22 feet.
Overall length, 16 feet
Cord, 4 feet.
Total wing area, 85 sq. feet.
Weight empty, 280 pounds.
Useful load, 200 pounds.
Speed range, 35 M. P. H. to 65 M. P. H.
Climb in ten minutes, 4,000 feet.



The "Cootie" Monoplane manufactured by the Weaver Aircraft Co., of Lorain, Ohio. It is powered with a 2 cylinder 30 H.P. motor

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, Assistant to the Second Assistant Postmaster General in Charge of Aeronautics
S. Murray Moore, Jr., Chief of Maintenance and Equipment

J. Clark Edgerton, Chief of Flying
John A. Jordan, Chief of Construction
George L. Conner, Chief Clerk, Aerial Mail Service
John A. Willoughby, Operator in Charge Radio Experiments
Eugene Sibley, Operator in Charge Radio Maintenance and Operation

Eugene J. Scanlon, Chief of Supplies

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Paul S. Oakes
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt

Charles I. Stanton, Superintendent New York-Washington Division
Walter H. Riddell, Superintendent, New York-Chicago Division
William J. McCandless, Superintendent, Chicago-Omaha Division
Samuel F. Doane, Manager, Heller Field, Newark, N. J.
William H. Read, Manager, Bustleton, Pa.
Duard B. Colyer, Manager, College Park, Md.
Andrew R. Dunphy, Manager, Chicago, Ill.
Maurice J. Kelly, Manager, Bellefonte, Pa.
William I. Votaw, Manager, Omaha, Nebraska
Victor W. Fitch, Manager, Newark Warehouse

PILOTS

Frederick A. Robinson
Walter J. Smith
Paul W. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris
Mark C. Hogue
Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen

Try Aerial Mail Service in California

The first official flight over the aerial mail route between San Francisco and Oakland and Los Angeles, Calif., was made recently by R. M. Durant, who covered the distance in four and a half hours' flying time. It is expected that regular aerial mail service between these cities may result from this successful trip.

Durant left Oakland at 10:01 A. M. and reached Chaplin Field, Los Angeles, at 3:33 that afternoon. He was greeted by W. S. Ryan, assistant superintendent of postal service, of Washington, D. C., and A. B. Foster, assistant postmaster at Los Angeles. Durant made a stop at Bakersfield for gasoline.

UNITED STATES POST OFFICE DEPARTMENT

NEW YORK-CHICAGO—AIR MAIL SERVICE

Monthly Report of Operation and Maintenance

FEBRUARY, 1920

Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	SERVICE AND UNIT COST						
													Gallon of Gasoline	Total Time Run		Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
														hr.	min.				
39A	$4.20	$2.45	$78.21	$34.40	$25.41	$93.11	....	$21.30	....	$75.00	$112.36	$446.44	15	....		....	....	....	....
40	....	....	78.21	34.40	25.41	93.11	....	71.20	$36.05	72.50	112.36	523.24	....	....		....	....	....	....
46	96.60	....	78.21	34.40	25.41	93.11	$61.92	213.36	50.85	72.50	112.36	838.72	345	5	22	452	1.3	$156.30	$1.86
49	63.00	4.03	78.21	34.40	25.41	93.11	90.96	59.29	....	20.15	112.36	580.92	225	7	53	610	2.7	73.68	.95
60	....	....	78.21	34.40	25.41	93.11	....	5.50	143.72	50.00	112.36	542.71	....	....		....	....	....	....
65	88.20	6.13	78.21	34.40	25.41	93.11	104.23	223.73	43.35	50.00	112.36	859.13	315	9	02	915	2.9	95.10	.94
66	341.79	39.28	78.21	34.40	25.41	93.11	516.33	358.58	555.49	50.00	112.36	2,214.96	1,230	44	45	4,393	3.6	49.50	.50
67	304.97	39.83	78.21	34.40	25.41	93.11	424.21	312.36	524.70	50.00	112.36	1,999.56	1,084	36	46	3,089	2.8	54.36	.65
72	....	....	78.21	34.40	25.41	93.11	....	159.75	49.85	50.00	112.36	603.09	....	....		....	....	....	....
75	351.03	46.14	78.21	34.40	25.41	93.11	494.21	385.59	438.06	50.00	112.36	2,108.52	1,265	42	50	4,158	3.3	49.20	.51
76	....	....	78.21	34.40	25.41	93.11	....	97.17	3.48	50.00	112.36	494.14	....	....		....	....	....	....
79	....	....	78.21	34.40	25.41	93.11	....	15.25	....	50.00	112.36	408.74	....	....		....	....	....	....
88	374.18	63.42	78.21	34.40	25.41	93.11	521.33	355.27	153.80	50.00	112.36	1,861.49	1,358	45	11	4,314	3.2	41.22	.43
89	69.34	4.42	78.22	34.40	25.41	93.11	39.42	264.96	1,281.82	50.00	112.36	2,053.46	238	3	25	290	1.2	601.02	7.08
92	....	....	78.22	34.40	25.41	93.11	....	4.88	....	50.00	112.37	408.39	....	....		....	....	....	....
94	....	....	78.22	34.40	25.41	93.11	....	79.54	....	50.00	112.37	473 05	....	....		....	....	....	....
101	270.96	34.27	78.22	34.40	25.41	93.11	462.10	314.25	163.00	50.00	112.37	1,638.09	940	40	03	3,633	3 9	40.92	.45
102	230.40	20.87	78.22	34.40	25.41	93.11	335.76	314.14	140.25	50.00	112.37	1,494.93	824	29	06	2,966	3.6	51.36	.50
104	111.54	14.74	78.22	34.40	25.41	93.11	217.11	121.51	11.00	50.00	112.37	869.41	399	18	49	1,707	4.3	46.20	.51
105	34.56	3.51	78.22	34.40	5.41	93.11	43.27	265.30	105.75	50.00	112.37	845.90	128	3	45	358	2.8	225.60	2.36
107	169.01	22.90	78.22	34.40	25.41	93.11	236.34	175.29	105.97	50.00	112.37	1,103.02	599	20	29	2,019	3.4	53.82	.55
108	....	....	78.22	34.40	25.41	93.11	....	18.76	....	50.00	112.37	412.27	....	....		....	....	....	....
111	66.36	16.25	78.22	34.41	25.41	93.11	....	201.05	65.40	100.00	112.37	792.58	237	....		....	....	....	....
201	35.00	....	78.22	34.41	25.41	93.11	....	186.65	110.05	200.00	112.37	875.22	125	....		....	....	....	....
202	7.00	4.00	78.22	34.41	25.41	93.11	....	203.80	236.30	200.00	112.37	994.62	25	....		....	....	....	....
203	....	....	78.22	34.41	25.41	93.12	....	175.50	106.10	200.00	112.37	825.13	....	....		....	....	....	....
204	*	....	78.22	34.41	25.41	93.12	10.58	405.77	2,007.25	200 00	112.37	2,967.13	*	..	55	80	....	....	37.09
205	....	....	78.22	34.41	25.41	93.12	....	55.27	....	200.00	112.37	598.80	....	....		....	....	....	....
206	*	....	78.22	34.41	25.41	93.12	24.10	366.46	132.17	200.00	112.37	1,066.26	*	2	05	145	....	511.8	7.35
24227	....	....	78.22	34.41	25.41	93.12	....	54.10	19.25	50.00	112.37	467.68	....	....		....	....	....	....
44305	....	....	78.22	34.41	25.41	93.12	....	10.00	18.30	35.00	112.37	406.83	....	....		....	....	....	....
Total	$2,618.14	$322.24	$2,424.69	$1,066.49	$787.71	$2,886.47	$3,581.87	$5,576.88	$6,501.96	$2,525.15	$3,483.33†	$31,774 43	9,352	310	26	29,129	3.1	$102.36	$1.09

Cost per mile, overhead, $.35; cost per mile, flying, $.23; cost per mile, maintenance, $.51.

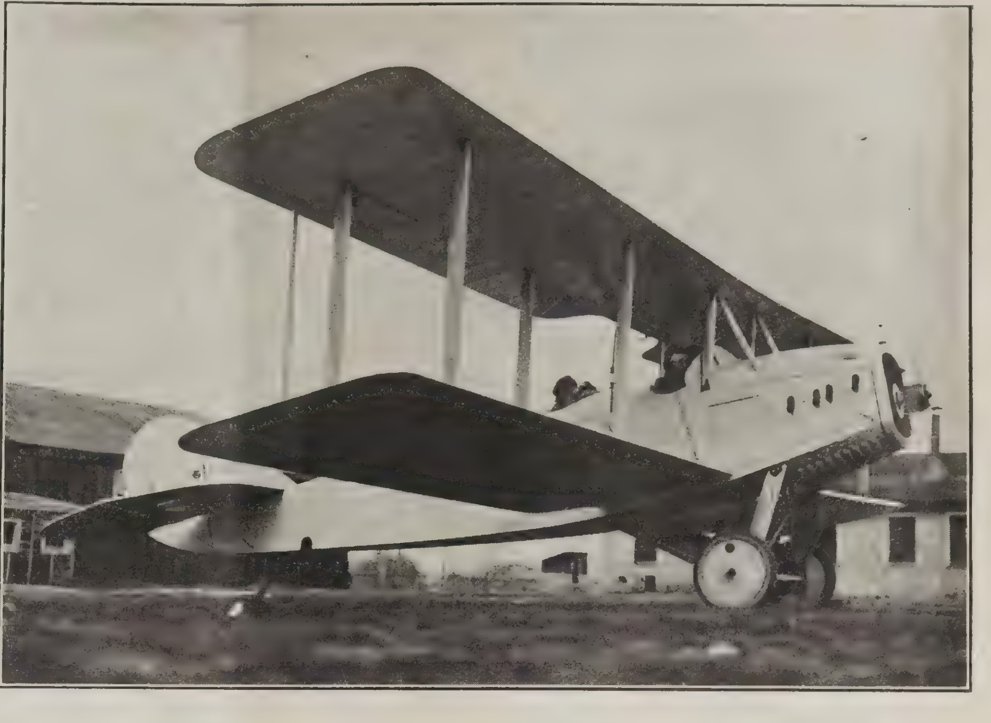
Note: Plane No. 39-A, Curtiss HA, equipped with Libetry 12 motor.
Planes Nos. 40 to 49, inclusive, Curtiss R4, equipped with Liberty 12 motors.
Planes Nos. 60 to 108, inclusive, and 24227, De Havilands, equipped with Liberty 12 motors.
Plane No. 111, Twin De Haviland, equipped with two Liberty 6 motors.
Planes Nos. 201 to 206, inclusive, Martins, equipped with two Liberty 12 motors.
Plane No. 44305, Curtiss JN4D, equipped with Curtiss OX5 motor.

*Ran on gas put in during previous month.

†Includes $545.63 covering work preliminary to the inauguration of service between Chicago and Omaha.

OTTO PRAEGER, Second Assistant Postmaster General

THE ORENCO TYPE "F" TOURISTER AEROPLANE



FLIGHT tests of the Orenco Type "F" Tourist Plane have given proof that the design is most satisfactory for cross-country touring and passenger carrying. The type "F" is the first commercial design of the Ordnance Engineering Corporation; heretofore the aircraft department of the company has been exclusively engaged in supplying aeroplanes to the United States Government, but while still building late types of military aircraft, the success of its first commercial plane serves as an encouraging beginning for the series of original sport and commercial types now under consideration.

When the Type "F" plane was exhibited at the New York Aero Show in March, some doubt was expressed as to whether the 150 h.p. engine would be sufficient for a 4-passenger plane with side-by-side seating. The plane was first tested with pilot alone and found to possess marked stability, quick climb and plenty of reserve power. Further tests were then made with one, two and three passengers, and in each case the same even stability and sensitive response to controls was observable. In one test with four aboard, and full fuel load, the plane rose from the ground after a run of about 200 feet. On another test with three aboard, the plane was flown at full speed parallel to the ground at a height of only a few feet and although a gusty wind was blowing at about 25 miles an hour, the plane kept an even straight course, necessitating practically no movement of controls.

There are no controls in the forward seat and the two front passengers have ample room. In the rear cock-pit the dual side-by-side controls allow either of the two occupants to handle the plane. The control arrangement is well suited for instruction for the pilot is close to his pupil who can see just what the pilot does throughout the flight. The close proximity of instructor and pupil makes vocal comment possible, thereby doing away with the "sign-language" instruction method.

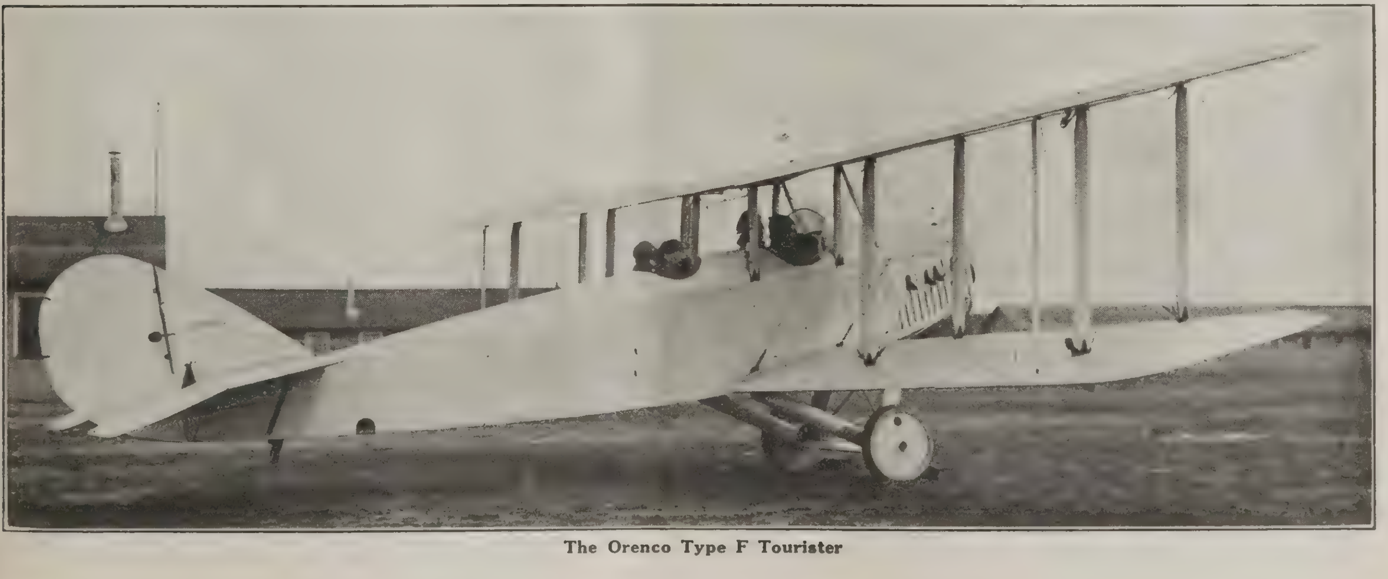
Specifications:

Performances

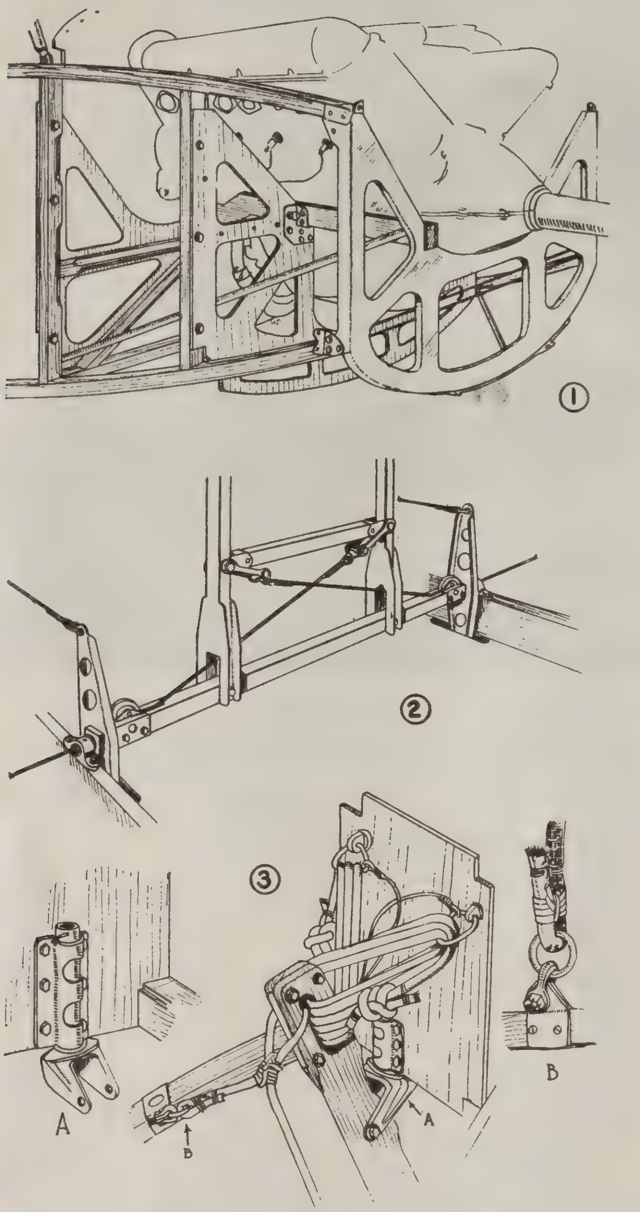
Number of passengers	Four
Engine, Hispano-Suiza Model A	150 h.p.
Weight—	
Empty	1,477 pounds
Fully loaded	2,432 pounds
Useful load	955 pounds
Fuel weight	200 pounds
Range at full speed	250 miles
Speed—	
Near ground	90 M.P.H.
At 5,000 feet	84 M.P.H.
At 10,000 feet	78 M.P.H.
Climb—	
To 5,000 feet	9 minutes
To 10,000 feet	24 minutes
To 15,000 feet	62 minutes
Loading—	
Per horsepower	16.2 pounds
Per square foot	7.15 pounds

Dimensions

Span—	
Upper wing	38 feet
Lower wing	38 feet



The Orenco Type F Tourister



1—Engine mounting; steel engine plate; veneer bulkheads; 2—Double side-by-side aileron and elevator controls; 3—Tail skid shock absorber system and swivel mounting

Wing chord, both planes	5 feet
Overall length	25 ft. 10 in.
Overall height	9 ft. 0 in.
Gap between wings	60 in.
Stagger	12 in.

Areas

Wing areas—	
Upper	182 square feet
Lower	173 square feet
Total (with ailerons)	355 square feet
Aileron area	41.3 square feet
Vertical areas—	
Fin	4.26 square feet
Rudder	9.6 square feet
Horizontal areas—	
Stabilizer	26.7 square feet
Elevators	21.6 square feet

Main Planes

The R.A.F. No. 15 wing curve is used. Wing chord, 5′ 0″. Span of both upper and lower wings, 38′. Wings are in four main panels in addition to the center panel which is 44″ wide. Upper and lower panels are similar in all respects. Gap between wings, 5′ 0″. Dihedral, upper and lower, 1.5°. Incidence, 2°.

Ribs built up with grooved spruce battens and basswood webs lightened between spars. All ribs are identical throughout and are equally spaced 12″ apart. Internal compression members between spars are square section spruce, tapered. Internal wiring with solid No. 10 wires and turnbuckles. Drift wires doubled in two inner bays and anti-drift wires single.

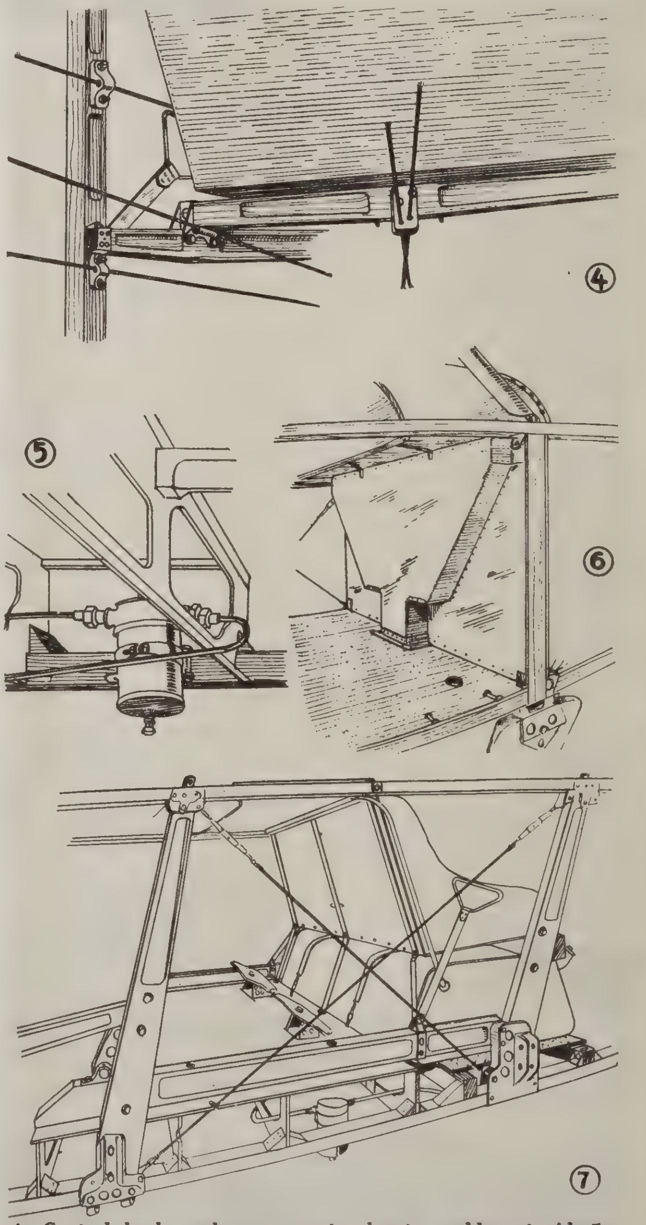
Leading edge of semi-oval section spruce. Spars of spruce channelled to I section between compression and wing struts. Trailing edge of light Shelby steel tube, attached to ribs with sheet copper strips. Wing ends of laminated spruce. Balsa wood used to round out curves where strength is not required. Mahogany veneer 1/16″ thick used on top of wings from leading edge to front spar. Flat head brass nails used throughout. All wood parts coated with Valspar varnish to protect them from moisture. Metal fittings and wires are enamelled to prevent corrosion.

Best grade A Irish linen used for wing covering. Fabric sewed on and bound with protective tape in the most approved manner. After three coats of dope, the wings are varnished and enamel applied in any desired color. Valentine's special grey used unless otherwise specified.

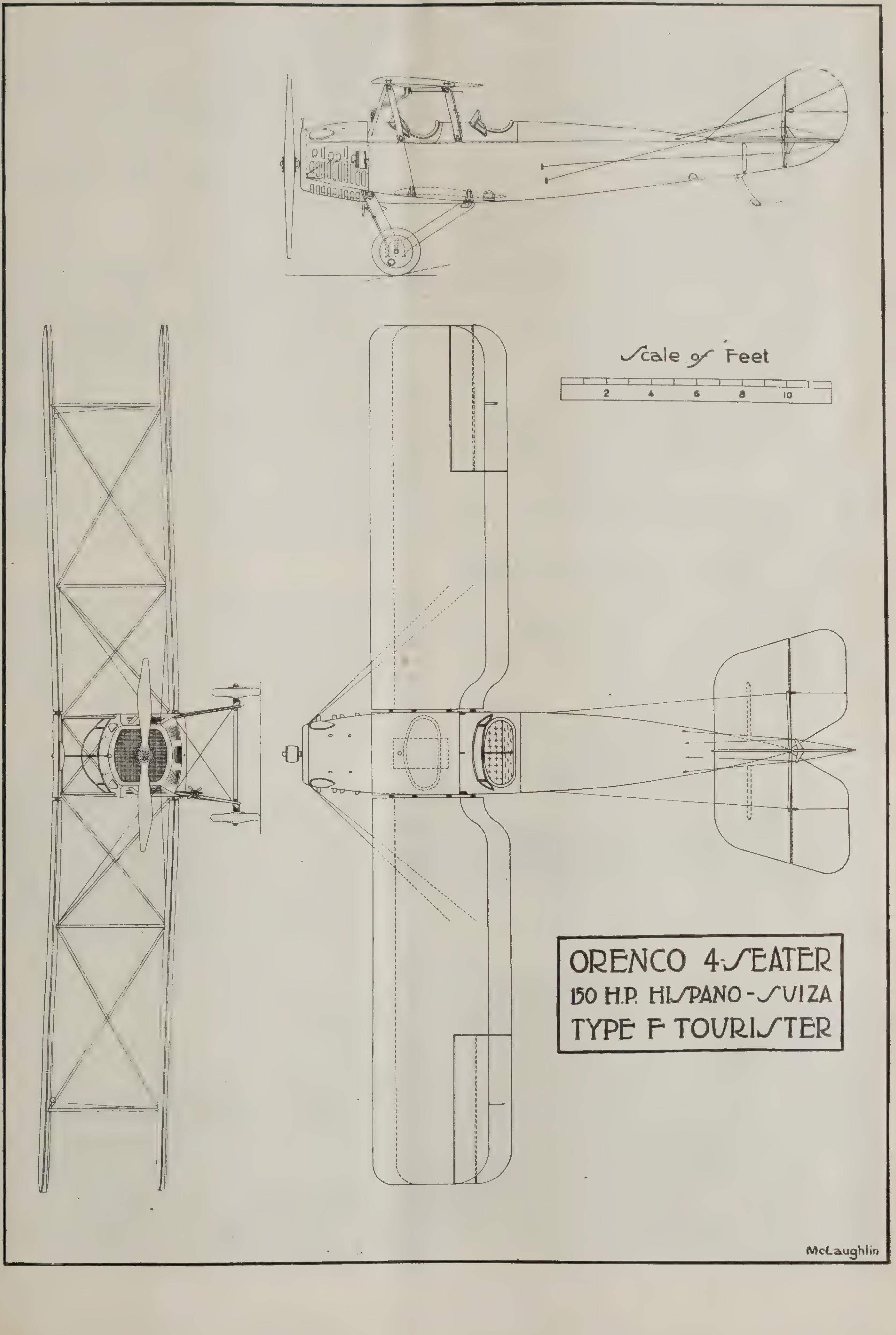
Wing Trussing

Interplane struts are all similar in shape with the exception of a variation in length to provide for the difference in gap between front and rear spars. Maximum strut section, 1½″ by 4½″. Upper ends of center section struts are 3′ 4″ apart. Intermediate struts are located 7′ 5″ from center line of plane; from these the outer struts are spaced 8′ 0″, leaving an overhang of 3′ 6″.

Strut fittings consist of an eye-bolt running through the cable plate and wing beam; another bolt running through the plate—fitting close to the incidence cable does not pierce the beam. Struts have a sheet steel plate fitting with a slot to



4—Control leads under rear seat; elevator cables at side; 5—Gasoline strainer located under floor of rear cockpit; 6—Aluminum fire shield separating front cockpit from engine; 7—Front seat arrangement showing 27 gallon main fuel tank


Scale of Feet
2
4
6
8
10
ORENCO 4-SEATER
150 H.P. HISPANO-SUIZA
TYPE F TOURISTER
McLaughlin

receive the eye-bolt. This fitting allows an adjustment of the stagger.

All cables 5/32" diameter; flying cables doubled.

Incidence cables are eliminated in the center section trussing, so that easy access to the front cock-pit is facilitated. Drift and anti-drift stresses are taken care of by a pair of inclined steel tube struts running from the center section to the fuselage. These tubes have solid steel adjustable forked ends; balsa wood streamline, wrapped with linen. Four drift cables run from lower longerons, aft of radiator, to ends of rear intermediate wing struts.

Fuselage

Length of fuselage from radiator face to stern-post, 21' 5"; maximum depth, 3' 8"; width at cock-pits, 3' 8". Centerline of propeller shaft 12.8" below top of upper longerons to which it is parallel. At the stern, the fuselage terminates in with a 14" steel tube.

When in normal flight position the top longerons are 6' 8" from the ground; in this position a line from wheels to skid makes an angle of 12° with the ground line.

Longerons of 1¼" square ash from radiator to rear of cock-pit; 1¼" spruce aft of rear seat. Spruce cross and vertical members cross tied with solid piano wire, No. 8 forward of pilot's seat, No. 10 aft. At the rear they are all tapered from 1¼" square at center to ⅞" at ends.

Aluminum cowls, No. 20 gauge, at cock-pits and on all sides from radiator to front center panel struts. Ventilating louvres about 3" apart. Aluminum on under side from front to rear chassis members. Elsewhere, grade A linen covering used. All aluminum coverings in region of the engine are provided with inspection doors and are attached with easily removable thumb screws drilled and locked with copper "safety" wire.

Turtle deck built up of light spruce T section longitudinal members supported on lightened veneer diaphragms. The deck is easily detached for adjustment or inspection of the internal fuselage wiring.

Control cable openings in body protected by heavy pig-skin slots stitched to the linen fabric. To facilitate handling, hand holes are provided on lower longerons forward of the stabilizer.

The radiator is supported on the sheet-steel engine plate. Engine bearers of laminated ash are supported on the engine plate and two veneer bulkheads. Steel tube braces are run from points near lower longerons at station 3 to front end of engine bed, and also from station 2 to lower edge of engine plate.

Seating Arrangement

Two passengers are accommodated in the front seats. Seats of mahogany-birch—mahogany veneer. Separate cushions for seats and backs. Safety belt straps carried down by means of a steel ribbon to one of the heavy longitudinal members near the lower longerons. A continuous aluminum fire wall separates the engine section from the front cock-pit. A locker located between top longerons and the curved cowling will hold about 2.5 cubic feet of contents.

Passengers' floor of three-ply veneer resting directly on lower longerons. Seats veneer. Veneer floor carried above lower longerons by lightened transverse stringers strengthened on the underside by longitudinal members to which the rudder foot bar pyramids are bolted.

Windshields of transparent celluloid are built up with aluminum frames. Rear shield is designed so as to permit unrestricted vision over the sides in making landings.

Instruments

The mahogany instrument board is fitted with a tachometer indicating up to 2,000 r.p.m., a Taylor Instrument Company's altimeter with zero mark adjustable with sea level, and indicating up to 25,000 feet; 8-day Waltham watch, oil gauge; Boyce distance-type thermometer for engine water temperature. All instruments have "radium" dials. Throttle control lever at center of instrument board so it may be operated from either right or left seat. Carburetor altitude adjustment lever at right longeron.

For starting, a Dixie Type 800 magneto is used. It is of the same construction as the larger magnetos and is mounted in front of the pilot's instrument board. The engine is primed through the pet cocks on the intake manifolds and turned over compression on about three cylinders, by the propeller. The mechanician stands aside and the pilot puts the ignition switch on and turns the starting magneto by hand. This gives a shower of sparks into one of the running magnetos and is transmitted through the carbon brush to the spark plug of the particular cylinder the engine happens to be stopped on. This starts the engine if the mixture is correct and all other things properly set.

Landing Chassis

Wheel tread 5' 6". Wheels 26" by 4". Axle 1½" diameter; 3/16" wall. Axle located 1" aft of lower wing leading edge. Chassis members of spruce 5' 5" by 1.5" streamline section. Upper ends secured to body by means of double forked plate fittings with longitudinal pins. Shock absorber cord attached to saddle fittings outside the chassis members, giving a maximum of impact absorption close to the wheels.

Double cables, with spruce fillers between, brace the forward chassis struts; no cables aft.

Two steel tubes space lower ends of chassis. A balsa wood streamline fairs in the spacing tubes. This streamline unit is 9" by 4' 0"; it has some of the properties of a wing and does not add to the head resistance.

Controls

Two control sticks and foot bars are provided in the rear cock-pit. Control column and members of square steel tube. The transverse shaft with sheet steel levers for elevators is carried on bronze bearings at either side of the cock-pit. Vertical columns have forked lower ends. A spacer bar is run between the columns about 8" above the transverse shaft. Aileron cables terminate at spacer bar ends. Cables run direct to guide pulleys which lead the cables through the transverse shaft bearings, from which point the cables emerge from the body. Cables run around pulleys at outer wing struts and then up to upper ailerons.

A steel tube bar, streamline with balsa wood, connects upper and lower ailerons. The compensating aileron cable runs from lower ailerons to pulley at upper wing and then across the underside of upper wing. Turnbuckles for adjustment at center section. Fibre guides on wing struts prevent wear and whipping of cables.

Elevator cables run direct from control stick levers to the steel-control arms on the elevators. A pair of rudder cables are run independently from each foot bar, using four cables in all. Fibre cable guides are bolted on the underside of pilot's seat.

Tail Group

Fin and rudder built up with steel tube frames. Rudder ribs of light gauge channelled sheet steel drilled for lightness, all wrapped and welded to the frame. The fin base measures 3' 5"; height, 2' 9". Fin stern-post of steel tube which continues down and fits into the steel tube fuselage termination. Tube braces from stabilizer to points 9" from top of fin. Maximum dimensions of rudder: height, 4' 6"; width, 2' 9".

Stabilizer bolted to upper longerons with ½° incidence angle. Stabilizer built up like the wings, with spruce ribs. Overall span at rear edge, 10' 0"; chord, 3' 4". It is supported from below by means of steel braces at its forward main beam and solid wires at the rear. Elevators are 2' 6" wide and measure 10' 10" from tip to tip.

Tail Skid

The ash tail skid is mounted on a universal fork bearing Upper ends tied with ⅝" rudder cord anchored to steel rings running through upper portion of the solid veneer bulkhead at the station nearest the stern-post. A steel cable limits the stretching of the rudder and a single length of rudder cord to lower longerons absorbs the rebound motion.

Rawhide lacing used to tie rudder cords together.

Lower end of skid is shod with a substantial metal shoe.

Because of the difficulties encountered by tail skids, special research was made to obtain a really efficacious skid and this design has proven exceptionally satisfactory in all its details.

Engine Group

The engine is an 8-cylinder Model A Wright-Martin Hispano-Suiza, developing 150 h.p. at 1,450 r.p.m. at sea level.

Bore and stroke, 120 m/m by 130 m/m. Displacement, 11,762.15 cubic inches. Weight of engine complete with hub-flange and bolts, carburetor and two magnetos but without radiator, oil, starting magneto, propeller or fuel system, 445 pounds.

Zenith Type 48 D.C. carburetor. Air is led to the carburetor by means of a megaphone duct behind the water radiator. The mixture proportion delivered by the Zenith is subject to a slight variation in passing from sea level to about 3,000 feet altitude. By moving the altitude adjustment lever at the side of cock-pit, the mixture can be corrected for about 10,000 feet altitude.

Gasoline consumption 13-15 gallons per hour at 1,450 r.p.m. Oil consumption, ¾ gallons per hour. Main fuel tank under front seat has a capacity of 27 gallons; gravity tank in center section, 8 gallons. Oil tank below flooring of forward passengers' compartment; capacity about 4 gallons.

PIONEER AIRCRAFT INSTRUMENTS

THE Pioneer Instrument Company of New York City has developed and is now producing a very complete line of navigational and flight instruments for aircraft. Their line includes the Compass, Banking Indicator, Turn Indicator, Air Distance Recorder, Air Speed Indicator, Drift Indicator and Running Lights.

The Compass, which is shown in Fig. 1, was originally designed for the U. S. Navy and is of the type now used by them exclusively. The Pioneer Compass is small and compact, very light in weight (two and one-quarter pounds) and is easily installed. It is really two compasses in one, for it has both a vertical and a horizontal card, and can be read from the top or side, and from either the front or the back. It can be mounted either on a horizontal surface or on the instrument board. The illustration shows it with the instrument board bracket. The cylindrical glass bowl acts as a lens and magnifies the vertical card, making it easily and accurately read. Very powerful magnets give it a short period with high directive force. It holds very steady in flight, and recovers the meridian quickly after being disturbed. Disturbances are reduced to a minimum by the glass construction, which greatly reduces the friction between the bowl and the liquid. It fits into the bracket on a shock-absorbing mounting and is not affected by vibration.

A very useful flight instrument is the Banking Indicator (Fig. 2). This detects and indicates any error in the lateral position of the plane, whether in straight flight or when banked. By its use skids and side-slips are easily avoided. The instrument is so sensitive that indications are given long before the human senses can notice the divergence from the lateral horizontal, yet it is very stable in action and does not oscillate. It gives a pilot a very comfortable feeling, particularly in clouds or bad weather, to have this little instrument to check up his own judgment. The Banking Indicator is small and compact, weighing less than seven ounces, and having a dial three inches in diameter.

The Turn Indicator

For flying in fog or clouds, or at night, a compass by itself is of little value. It is pratically impossible for a pilot to hold his plane on a straight course under these conditions, and a compass will not indicate correctly on a turn of any magnitude or duration. By using a Turn Indicator (Fig. 3) which shows the slightest divergence from straight flight, the pilot avoids turning and his compass will function properly. The face of the Pioneer Turn Indicator has two openings behind which a white shutter appears in indicating the direction of a turn. A straight course is maintained by steering so as to prevent this shutter from appearing on either side.

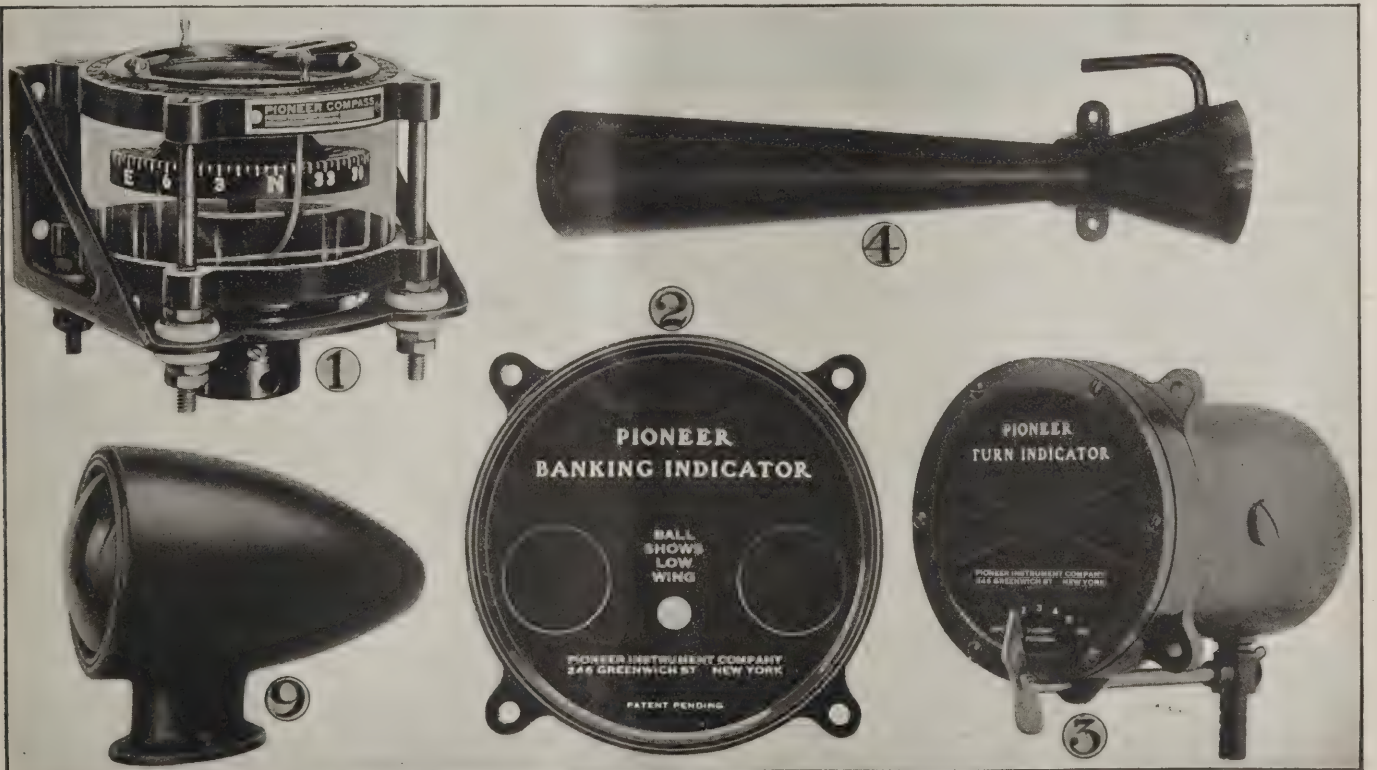
The sensitive element of the Turn Indicator is a small air-driven gyroscope, operated by the vacuum obtained from a compound Venturi Tube (Fig. 4). The gyro is mounted in such a way that it reacts only to motion about a vertical axis, being unaffected by rolling or pitching. The constructional details of the Pioneer Turn Indicator have been worked out very carefully. The whole instrument is non-magnetic, permitting it to be used close to the compass. The sensitiveness can be adjusted by means of a controller, to suit any flying conditions. The gyro runs on specially tested ball bearings, to which oil is supplied from a reservoir within the gyro. Clean dry air for operating is supplied by a flexible intake tube running to the engine section or to any other suitable place on the ship. The weight of the instrument is less than two pounds.

Air Speed Indicator

Due to the failure in service of so many of the mechanical types of Air Speed Indicators, many pilots have come to distrust them. In the Pioneer Air Speed Indicator (Fig. 5). which is of the liquid-tube type, there is nothing to get out of order. The only moving part is the column of liquid. Once it is properly installed it can be depended upon to maintain its accuracy. Pressure for operating is obtained from a small Pitot Tube (Fig. 6) which is usually mounted on a forward wing strut. The combined weight of the Indicator and Pitot Tube is only ten ounces.

A new instrument which is rapidly finding favor is the Pioneer Air Distance Recorder. This is an aerial log which measures and records the distance traveled through the air. Without an Air Distance Recorder, in flying in bad weather or at night, or over unfamiliar territory, the pilot must guess at his average air speed and keep careful note of his time, to estimate approximately the distance traveled. An air speed indicator, being accurate only at sea-level and reading less than half actual speed at 20,000 feet, is not useful for this purpose. Using an Air Distance Recorder, and making allowance for the wind, a pilot can be certain of arriving very close to his destination.

A Transmitter (Fig. 7) is mounted on one of the forward wing struts and carries a small propeller which revolves as the plane goes forward, once a mile actuating a valve which admits vacuum, created by a small venturi tube, to a Recorder (Fig. 8) on the instrument board, adding one mile to the indicated distance. The instrument can be reset to zero at


PIONEER COMPASS
①
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②
PIONEER
BANKING INDICATOR
BALL
SHOWS
LOW
WING
PIONEER INSTRUMENT COMPANY
246 GREENWICH ST NEW YORK
PATENT PENDING
PIONEER
TURN INDICATOR
PIONEER INSTRUMENT COMPANY
246 GREENWICH ST NEW YORK
⑨
③

Pioneer Instruments: 1. Compass; 2. Banking Indicator; 3. Turn Indicator; 4. Venturi Tube for operating. Turn Indicator; 9. Running Light

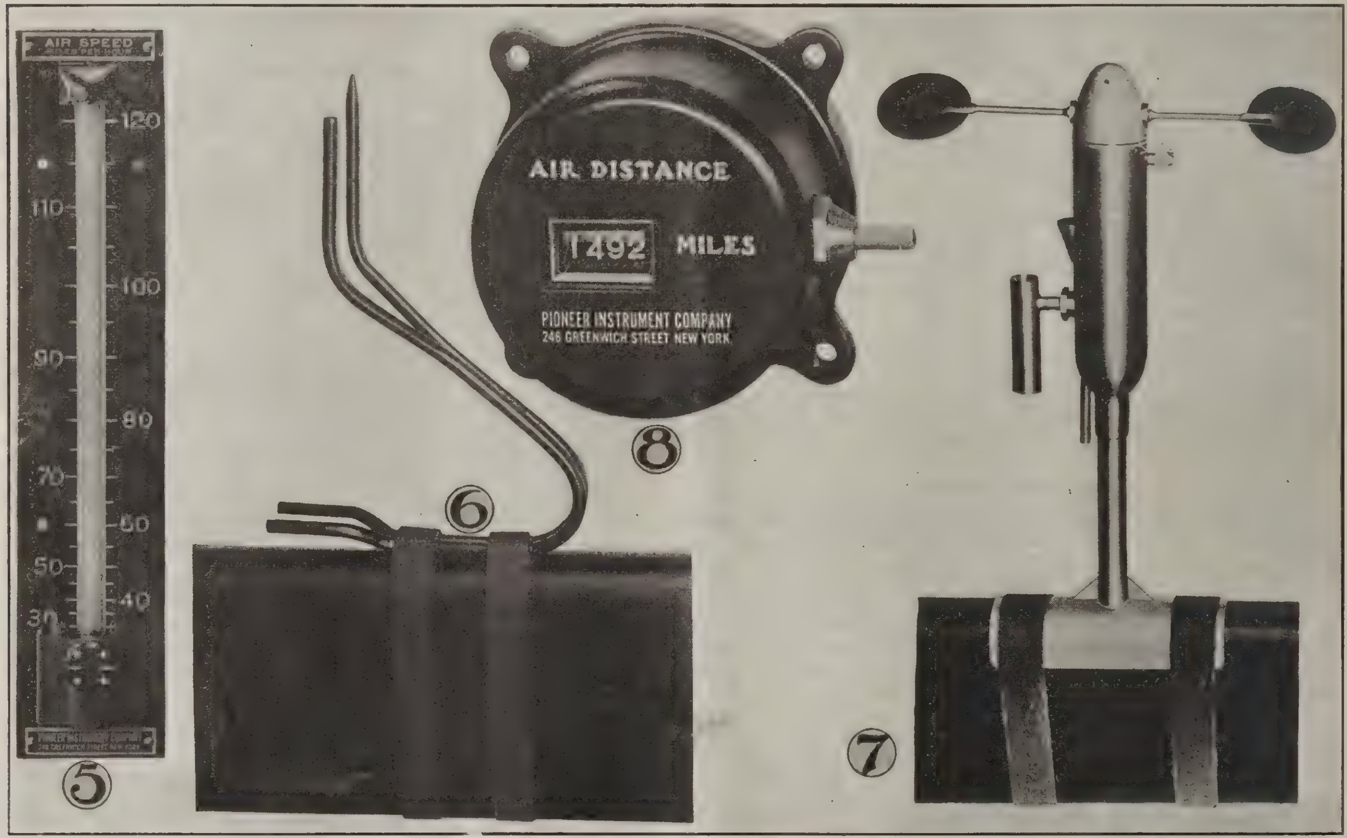
the beginning of each flight, or may be left to indicate the distance flown during any period.

The instrument is accurate within a fraction of one per cent at all flying speeds, and being nearly independent of the air density there is practically no error between sea-level and 20,000 feet. This makes the instrument ideal for performance testing. The speed of a plane can be obtained with great accuracy and with much greater facility than with any other method. It is only necessary to time the miles with a stop-watch.

The weight of the instrument is less than two pounds, and the head resistance of the transmitter is so small that it adds no appreciable load to the plane.

A useful aircraft accessory is the Pioneer Running Light (Fig. 9). The body of the light is a nicely stream-lined aluminum alloy casting, carrying a standard automobile type socket and equipped with a railway signal type of bull's eye. The lights are finished in black or olive drab enamel, and the complete set of three lights weighs less than a pound and a half. Installed on the wings the lights point forward, the left or port light having a red bull's-eye, and the right or starboard light having a green bull's-eye. The tail-light points to the rear with a clear white beam. These lights use standard double-contact automobile bulbs. They are made both for concealed and open wiring, the wires being taken into the light either from the bottom or from the back of the pedestal. The lights are strong, easily installed, and very nearly "fool proof" and have been adopted as standard equipment on a number of types of planes.

With the rapidly increasing aerial activity all over the country the need of accurate and reliable instruments is being more and more keenly felt, and the Pioneer Instrument Company is being kept busy on orders from commercial concerns and individuals, as well as on work for the government air services.



5. Air Speed Indicator; 6. Pitot tube used with Air Speed Indicator; 7. Transmiter to operate Air Distance Recorder; 8. Air Distance Recorder

Seaplanes Will Hunt Fish in Chesapeake

Washington.—Navy seaplanes are to be used in assisting Chesapeake Bay fishermen in spotting schools of menhaden.

Under arrangements approved by Secretary Daniels and now being worked out in detail by the commandant at the Norfolk Naval Station and representatives of the fishermen, the planes will carry a keen-eyed fisherman as an observer during their spotting operations. By instant radio communication he will be able to mobilize the "menhaden fleet" of steamers as soon as a school is sighted. The vessels now are being equipped with radio apparatus for that purpose.

Special Library Census Being Made

At a time when the government is counting up its inhabitants, the Special Libraries Association is enumerating the special library collections of the country because there does not exist at present an adequate directory of special libraries.

During the World War, when army camps and military centers were furnished with libraries for research and educational work, the men detailed to look up information for the government were hampered by the lack of a satisfactory list of information centers which they might call upon for emergency assistance. Time and again army men could have used a directory of institutions or corporations having special information which they would permit them to consult had such a publication been in existence.

In the spirit of co-operation and in order to list the special information sources of the country, the Special Libraries Association—the national body of special librarians—submits the following questions and respectfully asks you to take the trouble to answer them. When compiled, directory will not be used as a mailing list for advertisers, but merely for the purpose stated, viz., to have in a central place a record of the Special Information Sources of the country.

A special library has been defined as: "A good working collection of information either upon a specific subject or field of activity; it may consist of general or even limited material serving the interests of a special clientele; and preferably in charge of a specialist trained in the use and application of the particular material."

If your library comes within the above qualifications, the S. L. A. will appreciate the following information from you:

(1) Name of institution or company.
(2) Name by which library is known.
(3) Name of librarian or custodian.
(4) Can it be classified as any of the following: financial, business, legal, engineering or technical, institutional, municipal, reference, agricultural.
(5) If not, how can it be classified?
(6) Does it serve a special clientele?
(7) Would your librarian be willing to assist other special libraries to a reasonable extent?

The above data should be sent to Wm. F. Jacob, Chairman Library Census Committee, care of General Electric Company, Schenectady, N. Y., who will be glad to answer any questions relating thereto.

RECENT AERO PATENTS

1,272,309. AVIATION-HELMET. Joseph Paupa. Chicago, Ill., assignor to Thos. E. Wilson & Co., Chicago, Ill., a Corporation of Maine. Filed Aug. 25, 1917. Serial No. 188,246. (Cl. 2—117.)

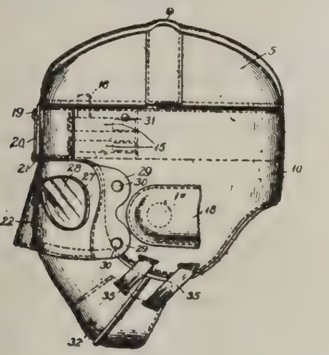
2. A helmet comprising a crown piece and a head band loosely connected thereto and consisting of a main section to embrace the sides and back of the head and a front section to engage the forehead, said front section being resiliently connected to said main section, an eye shield supported on said helmet and movable to and from operative position, and a chin pad resiliently connected to said head band.

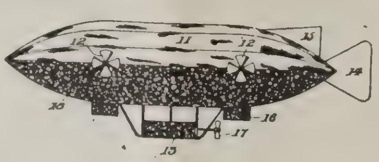
3. A helmet comprising a head covering, an eye and nose shield, a link pivotally connected to said shield and covering whereby the former may be moved upwardly to inoperative position and separate means independently connected to said head covering to protect the chin and mouth of the wearer.

6. A helmet comprising a head covering, an eye shield, a link pivotally connected to said head covering, and a hook on said shield normally gripping said link and disengageable therefrom by a downward pulling force applied to said shield.

7. A helmet comprising a head covering, an eye shield, a link, a hook on said head covering normally gripping one end of said link, said shield being pivotally connected to the other end of said link to permit movement of said shield to inoperative position.

9. A helmet comprising a crown piece, an expansible head band, an eye and nose shield, a link connecting said shield to said head band, and a chin pad separate from said eye and nose shield resiliently connected to said head band and carrying a mouth covering, the several parts being so formed as to completely inclose the head and face of the wearer when adjusted to operative position.





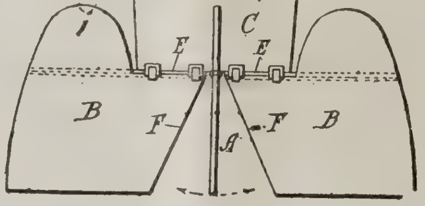
1,269,871. AEROPLANE. Hartvig Sorley, Macomb, Ill. Filed July 15, 1916. Serial No. 109,531. (Cl. 244—29.)

1. In an aeroplane a supporting structure having a fixed supporting area, and stabilizing mechanism including shiftable planes, channel shaped transverse guiding tracks for said planes, and roller bearings along the lateral edges of said planes and accommodated in the channels of said tracks.

15. In an aeroplane, a supporting structure, and stabilizing mechanism including shiftable planes, tracks for guiding said planes, a rack fixed to each plane, and means for moving said planes, such means comprising a stabilizer frame having a track depending from the supporting body of the aeroplane, inter-connected gears journaled in said track structure or frame and protected thereby, a sector in geared relation with said gears, and a weight guided by said track and movable in vertical plane for actuating said sector.

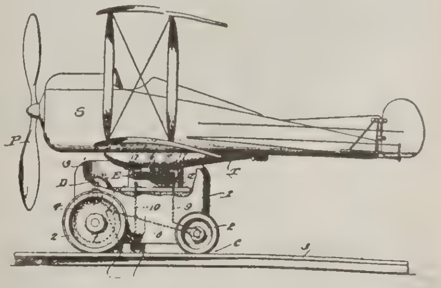
16. In an aeroplane, a plurality of main supporting surfaces, tilting auxiliary surfaces above said main surfaces, manual means for tilting said auxiliary surfaces, and friction means for preventing free movement of such auxiliary surfaces.

18. In an aeroplane, main supporting surfaces, auxiliary concaved surfaces disposed laterally above said main surfaces, a laterally disposed driving shaft, a driven shaft for each auxiliary surface, and intermediary shafts connecting said driving and driven shafts whereby said auxiliary surfaces may be simultaneously moved.



1,270,971. AIRSHIP. George E. Richmond, Austin, Texas. Filed June 6, 1917. Serial No. 173,198. (Cl. 244—3.)

1. In an airship, a driving propeller, a lifting propeller, a main motor for actuating the driving propeller, an electric motor for acuating the lifting propeller, a storage battery for supplying current to said electric motor, a generator driven in the operation of the propeller by the main motor for furnishing current to replenish the battery, and means for reversing the flow of current for supplying current from the battery to the generator so as to convert said generator into a motor for driving the airship.



1,272,211. LAUNCHING MECHANISM FOR AIRCRAFT. Godfrey Lowell Cabot, Boston, Mass. Filed Aug. 13, 1917. Serial No. 186,012. (Cl. 244—2.)

1. A launching mechanism for aircraft comprising a car, and an electro-magnet on said car for holding the craft thereon until the required speed has been attained, said craft having an armature attracted by said magnet.

5. A launching mechanism for aircraft comprising a track, a carriage thereon, means for connecting an aircraft to said carriage, means for propelling said carriage, and means for automatically throwing said propelling means into action when the aircraft propeller has started the ship and the carriage forward.

11. A launching mechanism for torpedo carrying aircraft comprising a car, and an electromagnet carried by the upper part of said car for holding a torpedo of the craft, the upper end of said magnet having a channel shaped depression extending in the direction of movement of the car and forming a seat to receive said torpedo.

WARPING OF AIRCRAFT PROPELLERS

One of the greatest troubles experienced with airplane propellers during the was was caused by the warping and twisting of the blades near the tips, and a large percentage of the propellers received at the front were rejected on this account.

In order to determine the causes and to develop methods of preventing this trouble, a number of experimental propellers were manufactured for the War and Navy Departments by the Forest Products Laboratory of the U. S. Forest Service at Madison, Wisconsin.

The propellers were made of Central American and African mahogany, using carefully selected stock uniform in density and moisture content, and were stored under uniform atmosphere conditions for 30 days between the roughing out and final carving operations. After the standard finish, consisting of five coats of spar varnish, had been applied, they were again stored under the same conditions for observation as to warping and twisting.

These propellers were made up and handled much more carefully than the commercial product, and every possible effort made to produce perfect results. After exposure to a very damp or humid atmosphere for three or four months, it was found that every propeller had warped or twisted or otherwise changed shape to an extent that made them unacceptable for use. They had all absorbed about five per cent of moisture through the five coats of spar varnish, and this moisture caused all the trouble. The treatments to which these propellers were exposed, namely, being manufactured in a relatively dry condition and later exposed to moist atmosphere, is very similar to that which is normally received by propellers made in the United States and shipped to France. Frequently propellers are made in a relatively moist climate and shipped to a drier one, and trouble from change of shape to drying out is almost sure to result.

There is only one way in which trouble from change of shape due to changes in moisture may be obviated, and that is to prevent these moisture changes. The experiments just outlined show that it is impossible even under ideal manufacturing conditions to produce propellers which will not warp or twist with changes in moisture.

These changes may be prevented either by applying a moisture-proof coating or by keeping the propellers under uniform atmospheric conditions throughout their life. At present, the aluminum leaf coating developed by the Forest Products Laboratory is the only practicable moisture-proof coating which has been sucessfully applied to propellers. It is not possible to keep propellers under absolutely uniform atmospheric conditions during manufacture and service, but these conditions can be approached by making up the propellers at the moisture content which they will normally reach in service. Propellers made up this way and coated with aluminum leaf have the best possible chance of giving high efficiency and long service.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Robert L. Stearns, about 24 years old, a relative of Col. Stearns, "Chief of Staff," was an enlisted man in December. 1917, a second lieutenant in February, 1918, a first lieutenant in April, and a captain in June, with 1,000 men under him (p. 1209). It took Col. Disque 19 years in the Regular Army to get what came to young Stearns in six months. Capt. Turner further testified "the public has been drugged by lying propaganda advertising the work of Gen. Disque and the Spruce Division" (p. 1204).

Capt. Turner was a married man with two children and was a practicing attorney of 11 years' experience. He claimed to have no personal enmity toward Col. Disque or other officers, but wrote to the committee, and also testified, that Col. Disque should be court-martialed for misconduct if still in the service (p. 1204). His credibility was evidenced by a letter dated July 5, 1919, addressed to him and placed in evidence, from which the following extract is taken:

> The work performed by you as fixed post representative at Douglas, Ariz., shows ability of high order and has been most effective and commendable. Expressing to you the thanks of the War Department and myself, I am, cordially, yours, Newton D. Baker, Secretary of War (p. 1212).

To the same general effect, as to conditions found under Col. Disque, is the testimony before the committee of Mallery, a married man and high-school superintendent (pp. 1076-1080); Lipps, a lawyer (p. 2424); Gross, a newspaper reporter (p. 2398); French, a master electrician (pp. 1267-1301); Hyde, a lawyer (pp. 563-573), all soldiers in the Spruce Division; Maj. Howes, Intelligence Department (pp. 2436-2446), and Kerrigan, Intelligence Department (pp. 2341-2385).

What the United States Should Have Produced

The production of Washington and Oregon loggers and mills, working largely on one eight-hour shift, appears in Spruce Corporation, as follows (p. 3687):

Production of Lumber by Years in Oregon and Washington

(Millions of Feet)

Year	Fir	Yellow pine	Spruce	Hemlock	Total all species
1916	5,118	587	317	337	6,715
1917	5,079	686	319	366	6,789
1918	5,478	658	492	344	7,313

Two shifts could have doubled the annual output of about 7,000,000,000 feet.

Aeroplane spruce, American mills, 79,366,508 feet.

Aeroplane fir, American mills, 59,906,684 feet.

(A small amount of cedar was also produced) (p. 1567).

The fir and spruce production alone in Oregon and Washington during 1916 and 1917 reached about 5,500,000,000 feet annually, or more than thirty times the amount of aeroplane lumber produced in 1918 under Col. Disque. About 100,000 workmen, in the more than 400 mills upon the coast, were employed in turning out the logging and lumber cut of the Northwest.

This situation existed before Col. Disque ever made a single spruce contract in the West. In other words, enough fir and spruce timber was produced during each of the several years before Col. Disque tried to learn the business to build from 50,000 to 100,000 aeroplanes a year, if facilities on the coast had been co-ordinated as was done in Canada and France. Five per cent of the total lumber production was more than enough to supply aviation needs of all the Allies combined. Col. Disque demonstrated his incapacity by his own record. The production of aeroplane lumber during eight months of 1918 up to the signing of the armistice, according to his own report, was as follows:

American Spruce Production, 1918, *by Months*

	Feet		Feet
April	13,583,165	August	18,861,506
May	11,864,722	September	16,682,639
June	9,000.134	October	22,145,823
July	13,776,251	November	7,427,928

(P. 1567)

From this statement of aeroplane production it will be noted that the results under Col. Disque's management were nearly stationary for several months, but somewhat increased during October, 1918. During these same months Pendleton with 10 per cent of Col. Disque's facilities, rafting 175 miles, without soldiers, without cost-plus contracts, and under many handicaps, was enabled to build up Canadian production from zero to 8,000,000 feet in November, or practically 36 per cent of the highest single month's production reached in the United States.

As early as September, 1918, more aeroplane lumber was being produced than could be used and Col. Disque was so notified. Gen. Carmack, representing Great Britain, declared that during the last two months of the war more aeroplane lumber was received than the Allies could use (p. 1653). Col. Disque testified that before the end of the war he had been directed to reduce production 33 per cent from previous calculations (pp. 1394-1395). Undisputed testimony shows that private operators were producing all aeroplane lumber produced on the coast before Col. Disque received word to retard operations.

Official Protests Against Disque's Illegal Contracts

Striking evidence of the lack of business methods pursued by Col. Disque and his associates without regard to law or other restraint is submitted herewith:

On April 30, 1918, the Bureau of Aircraft Production had became so fearful of Disque's unbusiness-like method of procedure that Capt. L. C. Preston, of the Finance Division, wrote Maj. Brown, of the Finance Division of the Bureau of Aircraft Production, as follows:

> It has recently developed that Col. Disque has for some time past assumed that he has the right to approve all contracts, according to notice sent to this department by Capt. Crisp in letter of February 11, with the result that all contracts since the latter part of January have been made without being approved by this department or the Chief Signal Officer, the more important contracts which have not been approved being the three cost-plus contracts for rived spruce with Grant Smith-Porter Bros. Co., Warren Spruce Co., and the Airplane Spruce & Lumber Co., estimated at $13,000,000 each, and the contract with H. S. Mitchell for the management of the cut-up plant. By reason of the agreement entered into in these four contracts, it would seem that it would be desirable to exercise some supervision regarding the terms and legal form of the more important contracts entered into by the Spruce Production Division (p. 2164).

Capt. Preston later became head of the War Credits Board, according to witness Gabrielson (p. 2164).

(*To be continued*)

NAVAL *and* MILITARY AERONAUTICS

Flying Training for Ground Officers.

Flying officers stationed at Langley Field, Va., and particularly those officers who are assigned to ground duties, have been detailed to squadrons for regular flying duty in order to maintain a maximum of efficiency. In this connection a series of instructional missions have been instituted. These missions include photographic, radio, formation flying and gunnery practice. The studies and missions are so distributed that all officers detailed with squadrons and squadron officers will receive approximately the same amount of flying training.

Supply Parachutes to Air Service Units

After a series of tests a satisfactory aeroplane parachute has been developed and adopted for use by the Army Air Service. Supplies of parachutes are now being distributed to various organizations in the field.

The aeroplane parachutes are installed, tested and used under the supervision of graduates in this work in order to insure against the possibility of accidents.

Opportunities will be given to all officers and enlisted men who may desire to make actual use of them in connection with their flying activities.

Observer Training for Aeroplane Pilots.

The Air Service School of Aerial Observation for training of observation pilots and observers has been authorized by the War Department to be established at Post Field, Fort Sill, Okla. This school will be ready to accommodate twenty students about May 1. In order that those officers of the Air Service who are pilots may have the oportunity of acquiring the additional rating of aeroplane observer, thus increasing their knowledge and efficiency and consequently enhancing their value to the Service, twenty officers will be selected from the list of applicants, to be transferred to Post Field for the three months' course required to obtain this rating. It will be the policy of the Air Service henceforth to require that all candidates for the rating of aeroplane observer first become aeroplane pilots. The twenty officers to be selected for the present detail are, therefore, initiating this policy. It is planned that upon completion of their training at the Observation School these officers will attend further courses in liason training at both Artillery and Infantry schools. Any flying officer of the Air Service not at present rated as an aeroplane observer may make application to the Director of Air Service through his commanding officer for permission to take this course.

Balloon Companies Leave Fort Omaha

The 17th and 27th Balloon Companies have left Fort Omaha, Neb., in a special train bound for San Francisco, thence to the Philippine Islands. Each company had a complement of 174 enlisted men and two officers. The 17th Balloon Company is in command of Captain H. T. Lewis and the 27th in command of Captain W. A. Gray.

Reserve Officers Not to Be Called for Training in 1920

The Department of the East has made public the following War Department orders concerning reserve officers:

"Members of the Officers' Reserve Corps and members of the Regular Army Reserve will not, in general, be called to duty for training during 1920. In no event will any reserve officer or any reservist be called for training during the present calendar year without his consent.

Army Uses Navy Planes for Panama

Washington.—The Navy Department has turned over to the Army Air Service twelve HS-2-L flying boats from its surplus supply. The transfer was made in accordance with an agreement reached between Secretary of the Navy Daniels and Secretary of War Baker.

The flying boats are to be sent to the insular possessions. Several are now stationed in the Panama Canal Zone, Hawaii and the Philippines. In fact, it is the most satisfactory type of aircraft for this service, due to the rugged and mountainous nature of much of the country.

Activities of Army Balloon School, Fort Omaha

The flying time at Fort Omaha for the week of March 21st shows a total of 916 minutes, of which 243 minutes consisted of two free balloon flights. The first flight started from Fort Omaha and landed at 2 miles north of Mandermin, Iowa, the distance traveled being 40 miles, and the trip consuming 1 hour and 20 minutes. The Balloon was piloted by Second Lieutenant J. B. Hall, and carried as passengers Captain W. A. Gray, First Lieutenant C. H. Maranville, Second Lieutenants R. A. Gibson and H. R. Wells and Master Electrician Moody. The second flight left Fort Omaha and landed 4 miles from Calhoun, Iowa, the distance traveled being 13 miles and the time 1 hour and 27 minutes. The Baloon was piloted by Second Lieutenant W. E. Huffman and carried as passengers Captain H. T. Lewis and Second Lieutenants W. E. Connolly, C. Bowling, H. R. Wells and J. A. Physioc. At the conclusion of this fight Captain Lewis made a solo fight, landing at Missouri Valley, Iowa, and traveling 18 miles in 1 hour and 15 minutes.

There are two balloon companies scheduled to leave this post for the Philippine Islands; each company having a strength of approximately 174 men, and carrying with them a large amount of equipment.

Ratings Issued to Discharged Aviators

From personnel orders issuing from the office of Director of Army Air Service rating aviators now separated from the Service, it is apparent that a large number of expert flyers are now available for flights other than military. Recent orders issuing ratings as Reserve military aviators carried the names of these former officers of the Air Service: J. Carroll Cone and Edwin B. Hagerty, former captains; William C. Carr, Kenneth E. Griffith, William D. Grant, Joseph H. Carr, James C. McAvoy, Arthur McAleenan, Paul N. Montague, Minor C. Markham, Robert C. Harrington, Earle E. Neubig, Charles A. Pavey, Byron Bilderback, Clifford R. Powell and Edwin L. Porch, former first lieutenants; Randall T. Henderson, John R. Perkins, Albert J. Hoffman, Robert C. Payton, Earl D. Forsythe, Otis C. Hale and Leo J. McGin.

Members of the crew which will man the R-38 on its Trans-Atlantic journey to America. Left to right, Chief Petty Officers Christansen, O'Clair, Pay, Coons and Russel, First Class Quartermaster Carlson, Chief Petty Officers Cullinan and Harrigan, Chief Boatswain C. I. Aller, commanding the crew, Chief Petty Officers Pettitt and Johnson and First Class Machinist's Mate Julius

© Keystone

Aeronitis

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Last Tail Spin

(With apologies to the Bird who wrote "The Lost Chord")

Seated one day in an Airplane,
  I was bored and a bit blasé,
And my fingers wondered idly
  Over the throttle's way.

I knew not who I had with me,
  Or what I was trying to make,
But I knew when we came to earth
  Again we would have a grand headache.

We took off, climbing steeply,
  Like the climb of a fast machine,
For the R.P.M's. were mounting;
  The Canuck turned a good fourteen.

We spinned, looped and we rolled her,
  Flew with her through the rain;
It was the harmonious jumble
  Of a Flyer gone insane.

It linked all perplexed flying
  Into one perfect flight,
And trembled away to a tailspin,
  From which we were to alight.

I sought the rudder vainly,
  To right that ship divine,
But the passenger jammed the rudder;
  His head was bone like mine.

It may be that spinning is funny,
  Or graceful to look at, but then,
It's damned sure that, with a passenger,
  I'll not do a spin again.

A FEW HUNDRED YEARS AGO THE SAFEST HUMAN ABODE ON THIS CONTINENT WAS THE CAVE ——
SAFETY FIRST
AND AGAIN MIGHT IT BE BY 1923

(*The Naviator*)

Lochinvar Up-to-Date

Young Lochy, ballooning, came out of the fog
In his Q-23—he was flying *incog;*
He had smiled all the way through a forty-mile gale,
As he thought out his plan and hereby hangs the tale.
For a chap with a little eight-cylinder car
Was to wed the fair Helen of Young Lochinvar!
His blimp was maneuvering 90 an hour,
For his gondolas carried 800 horse-power,
But he slacked his propellers when coming in view
Of the home of fair Helen on Fifth Avenue.
He circled the heavens above her and, poof!
Landed softly on top of her old daddy's roof.
He slipped down the fire escape, not to alarm
The guests at the wedding—he meant them no harm—
But had he been found there without an excuse
They might have mistaken the Ace for the deuce!
He looked at the crowd as he sat on his perch,
And just as they started to go to the church
He jumped through the window and picked up the bride
And carried her out with a strong manly stride.
The bridegroom right after him hollering "Stop!"
As onward they scrambled till over the top,
When Lochinvar handed the bridegroom, alas!
A few cubic inches of hydrogen gas!
Then buckling a belt on his lady's slim waist,
He gave her a coat and some goggles in haste,
For her relatives, hitherto standing aloof,
Were now on their way *en famille* to the roof
And the language was not a polite *parlez vous*
That was heard at that moment on Fifth Avenue.

—*S. E. Redford.*

Some Shot

The Irish night watchman at the flying field was watching some men take meteorological observations. He paused to watch a man peering through a large telescope. Just then a star fell.

"Man aloive," he exclaimed in amazement. "You're sure a foine shot."

Pretty girl was eagerly watching a drill at a camp, when a rifle volley crashed out. With a surprised scream she shrank back into the arms of an Army aviator who was standing behind her.

"Oh, I beg your pardon," she exclaimed, blushing, "I was so frightened by the rifles."

"That's all right," said the aviator. "Let's go over and watch the heavy artillery."—*Lehigh Burr.*

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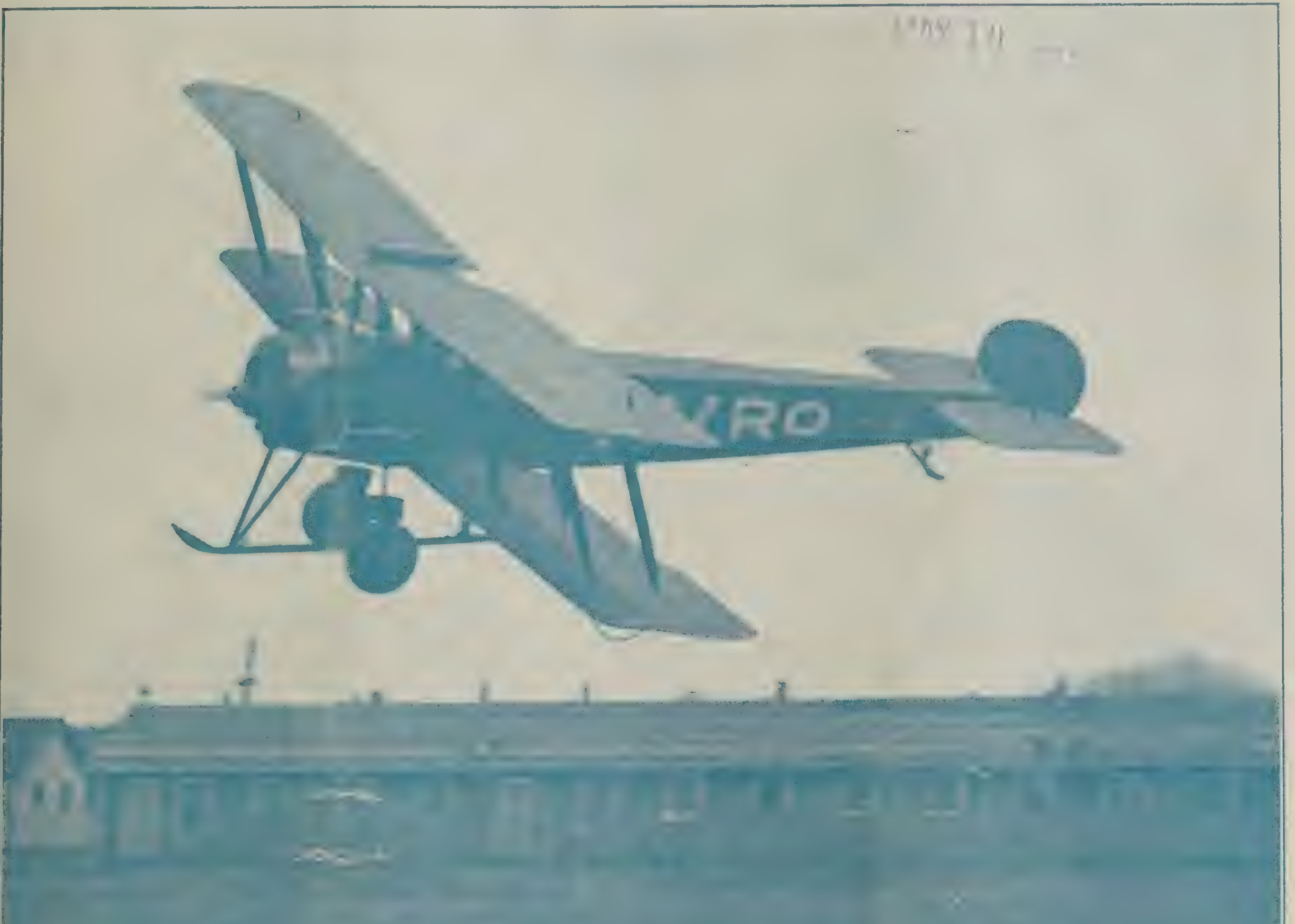

Demonstrating the Maneuverability of Interallied Aircraft Corporation's Avros at Mitchell Field

Twenty International and National Aerial Contests to be Discussed at Atlantic City

UBLISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
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In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

Aerial Transport Service

which, it is hoped, will eventually serve all of the important cities on the North American Continent.

The plans for this service have been developing for months and will vitally influence Civil, Commercial and Military Aviation throughout the world.

These plans are worthy of the confidence and support of all classes of Citizens, City, County, State and National Officials.

The quality of the personnel is a guarantee that the enterprise will be directed by men qualified by previous experience to manage successfully any undertaking they are identified with.

If You Want to Fly—

and have it in you—we'll make a pilot of you

Our methods instil confidence from the start. From your first lesson by the Philadelphia Aero-Service School of Flying you know that you are taking the air with the most skilled instructors in the business. You know you are training at a safe field, perfect for the purpose, with the very best, up-to-the-minute plane equipment that money, backed by judgment, can buy.

We have made a master pilot of every student who has entered the school with the real spirit of the great flying game. All you need is a desire to be an aviator, and the common sense to "carry on" as your instructors direct. The rest is up to us—and our record is one hundred per cent with both men and women students.

If we cannot make a flier of you, we frankly tell you so, and refund your tuition — our reputation is at stake.

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Miss Volora R. Nelson, trained by us, the first woman to obtain an expert pilot's license from the Aero Club of America.

Roy J. Musselman, who left our field to start in business for himself a few days after obtaining his license.

Write for folder describing our methods and tuition cost

PHILADELPHIA AERO-SERVICE CORPORATION
636 Real Estate Trust Bldg.,
Philadelphia, Pa.

AERIAL AGE WEEKLY

VOL. XI. MAY 10, 1920 NO. 9

TABLE OF CONTENTS

PAGE

Twenty International and National Aerial Contests to be Discussed at Atlantic City May 20 to May 30. . 283

The News of the Week. 285

The Aircraft Trade Review. 287

Aeronautical Camouflage 288

The Boulton & Paul Commercial Machine 290

Resistance to Decay Now a Factor In Choice of Aeroplane Wood. . . 292

Some of Atlantic City's Leading Hotels 293

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures. 294

Naval and Military Aeronautics. . . 295

Foreign News. 296

Elementary Aeronautics and Model Notes 297

Aeronitis 299

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167-A

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VOL. XI NEW YORK, MAY 10, 1920 NO. 9

TWENTY INTERNATIONAL AND NATIONAL AERIAL CONTESTS TO BE DISCUSSED AT ATLANTIC CITY, MAY 20 TO MAY 30

TWENTY great international and national aerial contests, which will start a new epoch in aerial sport and stimulate progress in aeronautic art, are to be discussed at Atlantic City at the Third Pan-American Aeronautic Congress, May 20 to May 30.

The transatlantic flights, the London to Australia, Paris to Melbourne, London to India, Cairo to Cape, Rome to Tokio, the flight across the Sahara Desert and other great flights have opened the world's airways, and thanks to the progressive work of the Special Commission of the Aero Club of America and the Aerial League of America, which is organizing the First Aerial Derby Around the World, it is now possible to plan world-wide events. There will soon be aero clubs in thirty-two countries affiliated with the International Aeronautic Federation, which will supervise international aerial contests and the three great annual contests to be held each year, namely, the Pan-American Aerial Derby, the Aerial Derby Around the World and the Aerial Circuit of the Atlantic. These national aero clubs have approximately 400 other aero clubs affiliated with them.

Contests with large prizes open to American pilots holding the Federation Aeronautique Internationale (F. A. I.) pilot certificate, issued in the United States by the Aero Club of America, the sole representative of the Federation in the United States, to be discussed at Atlantic City, May 20 to May 30, are:

(1) The $25,000 prize, offered through the Aero Club of America by Mr. Raymond Orteig, for the first flight from New York to Paris or vice versa.

(2) Los Angeles Aeroplane Rally, with prizes amounting to between $25,000 and $50,000, organized by the Aero Club of Southern California and the Aerial League of the Pacific Slope, to be held in the Fall. For details address Mr. K. M. Turner, President Aero Club of Southern California, Hellman Building, Los Angeles, California.

(3) The contest for devices and features that make for safety in aeroplanes, for which prizes totalling 100,000 francs have been offered by the Union for Aeroplane Safety.

The contest is to be unlimited in scope and the Union will consider any new principles in the construction of aeroplanes as a whole, or the undercarriage, fuselage, wings, controls, devices to be attached to aeroplanes or improvements of the engines, propellers, carburetors, radiators, spark plugs, tail skids, aeroplane brakes and automatic stabilizers, parachutes, aeroplane intruments and other devices. Inventors and manufacturers are invited to suggest improvements for which prizes should be offered by the Union, addressing the suggestions to the Aerial League of America, 280 Madison Avenue, New York City. The regulations for the contest and the prizes to be offered for different classes of improvements will be decided after receipt of suggestions from the inventors and manufacturers of the eighteen countries represented in the International Aeronautic Federation.

(4) First Alaska Aerial Derby for seaplanes, with $35,000 in prizes, organized by the Aero Club of the Northwest. Start from Seattle to Juneau, Alaska, and return by way of Skagway, Sitka, Petersburg, Wrangell and Ketchican, 870 miles. Open to pilots of all nations holding the F. A. I. certificate issued in the United States by the Aero Club of America. Address entries to Mr. Teel Williams, President Aero Club of the Northwest, Seattle, Washington.

(5) The *Daily Express* $50,000 prize for the first flight from Great Britain to India and back between May 1 and October 31, 1920, open to all pilots holding the F. A. I. certificate. Entries can be made through the Aero Club of America, or direct to the Royal Aero Club of the United Kingdom, London, England.

(6) The seaplane contest to be held at Brescia, Italy, in September.

(7) The King of Belgium Seaplane Challenge Trophy and prizes approximating $100,000 for a seaplane contest to be held at Antwerp, Belgium, in July, 1920.

(8) The six Intercollegiate Trophies and $5,000 Valentine prizes for intercollegiate contests being organized by the Aerial League of America. Entries should be addressed to Major Reed G. Landis, Secretary, Aerial League of America, 280 Madison Avenue, New York.

(9) The Curtiss Marine Flying Contest for $1,000 cash prize, open to members of the Aero Club of America and its affiliated clubs. Entries should be addressed to the Aero Club of America.

(10) Chicago Aerial Rally with prizes approximating $50,000, to be held in July or August, being organized by the Aero Club of Illinois. Address inquiries to Mr. James E. Stephens, Vice-President Aero Club of Illinois, Chicago, Ill.

(11) The International Aviation Trophy Contest to be held in France, September 27 to October 3, 1920, for which the national aero club of each of the countries represented in the Federation can enter three representatives. The Aero Club of Texas and the Dayton-Wright Airplane Co. have each made an entry in this contest. The Aero Club of Illinois is also considering making an entry.

(12) The International Marine Flying Trophy Contest, $5,000 first prize, to be held in Italy in September, for which the national aero club of each of the countries represented in the Federation can enter three representatives. American entries must be made through Aero Club of America.

(13) The International Balloon Trophy Contest, to be held at Indianapolis on October 22, for which the national aero club of each of the countries represented in the Federation can enter three representatives. Entries must be addressed to Aero Club of America, 297 Madison Avenue, New York.

(14) The International Aerial Derby Across the United States, with $100,000 in prizes, being organized by the Aerial League of America, which will be open to all the national aero clubs and clubs and organizations affiliated with the Aerial League of America and the Aero Club of America. Date to be announced later.

(15) The Pulitzer Trophy, competed for annually under rules formulated by the Aero Club of America.

(16) The $2,000 Glidden Aerial Trophy Touring Contest, being organized by the Aerial Touring Association, of which Major Charles T. Glidden, of the famous Glidden Tours, is president. Entries must be addressed to Aerial Touring Association, 280 Madison Avenue, New York City.

(17) The First Aerial Derby Around the World, the rules and regulations of which are being considered by the Federation at date of writing, and for which $1,000,000 in prizes are being raised. This stupendous contest is to be an annual event, and the first Derby will take place as soon as the national aero clubs have made the necessary preparations to take care of organizing this event in the territory over which they have jurisdiction.

(18) The Aerial Circuit of the Atlantic from New York or Atlantic City southward by way of Cuba, Haiti, Porto Rico, across the Caribbean Sea, to Caracas, along the coast to Pernambuco, across the Atlantic to Dakar, on the west coast of Africa, then northward along the coast of Africa, touching Magodor and Casa Blanca, then across Spain or Portugal to Biarritz, then along the French coast and across the English Channel to London. Then either across the Atlantic by way of Ireland to Newfoundland, or touching and across the Atlantic by way of Iceland, Cape Farwell, Newfoundland, Halifax, Portland, Boston and New York.

This annual contest has been proposed by the Aerial League of America and the tentative project has been submitted by the Aero Club of America to the International Aeronautic Federation for consideration of the national aero clubs of the eighteen countries in the Federation. There is a possibility that it may be organized this year. Otherwise it will be organized next year. Prizes amounting to $100,000 are proposed for this contest.

(19) The Pan-American Aerial Derby, to be held each winter, for which $25,000 in prizes has already been offered by Mr. Carl G. Fisher. The rules and regulations have been submitted to the International Aeronautic Federation by the Aero Club of America for approval and adoption by the Aero Clubs of the twenty countries affiliated with the Federation. The competitors in this Derby will start from Miami either in November, December or January each year and fly to Cuba, then to Guatemala, then to Panama and across the Isthmus to Colombia, Equador, Peru, Chile and from there either across Argentine or by another route to be decided to Buenos Aires, Argentine, then to Uruguay, Rio de Janeiro, Brazil, Pernambuco and along the coast to Guiana, Venezuela, then across the Caribbean Sea to Porto Rico, Haiti, Cuba and back to the United States.

(20) The $1,000 Aerial Life Preserver Trophy, offered for annual competition by the Aerial League of America to test and ascertain the improvements made in aerial life preservers or parachutes. Applications for entries should be made to the Secretary, Aerial League of America, 280 Madison Avenue, New York City.

Every Person Interested in Aeronautics Invited to Discuss Rules and Regulations

Aerial Age is asked to extend a cordial invitation to all its readers to attend the Third Pan-American Aeronautic Congress at Atlantic City May 20 to May 30 and participate in the discussion of the rules and regulations of the above contests which are to take place at the Steel Pier afternoons and evenings.

Also to attend the official lunches to be held, at which authorities will deliver important messages.

Flying is to take place daily at the Atlantic City Airport, which is the only airport in the United States operated as an aerial garage, affording every facility to air travellers.

Among the other entertainments in which those attending the Congress and their friends can participate are the Spring Dances to be held at the Convention Hall Saturdays May 22 and 29. People can, therefore, combine business and pleasure when attending this epoch making event.

A view up the Boardwalk at Atlantic City, with the Traymore in the foreground, as it will look to the aerial visitors at the Third Pan-American Aeronautic Congress and the First Aerial Touring Congress, to be held at Atlantic City, May 20 to May 30

THE NEWS OF THE WEEK

Seaplane Flies From Miami, Fla., to New York City in 15 Hours, 35 Min.

Flying from Miami, Fla., to New York City in less than a day was the excellent record made by an HS-2L flying boat, operated by the Aero, Ltd. last week. The actual flying time was 15 hours 35 minutes, allowing an hour's difference for daylight saving. The plane left Miami at 3 A. M., came down only once for fuel at Morehead City, N. C., and landed in the Hudson River off Eighty-sixth Street, New York City, at 8:35 P. M. that evening.

The flying boat was piloted on the journey, the greater part of which was in a driving rainstorm, by Harry Rogers and Sidney Schroeder. Edward P. Bohn, a mechanic, also accompanied the craft on its flight northward. The landing of the huge craft in front of the Columbia Yacht Club landing was a tribute to the skill of Rogers and Schroeder, as total darkness had set in.

"Miss Miami," as the plane was christened before leaving Miami, was brought here by the Aero, Ltd., to be placed in passenger service between New York and Boston. The same company has been operating lines between Miami and Bimini.

The aviators brought with them a letter of greeting from Mayor William P. Smith, of Miami to Mayor Hylan. E. G. Sewall, President of the Miami Chamber of Commerce, sent a message to the officials of the Chamber of Commerce here. T. D. Dunn, a jeweler in the Southern city, availed himself of the opportunity of sending an eight-karat diamond ring, addressed to his Atlantic City store, by the HS-2L.

President Sewall, of the Miami Chamber of Commerce, in his letter expressed the hope that regular aeroplane service between the two cities would be an accomplished fact soon.

Senate Provides $25,000,000 for Naval Aviation

The Naval Appropriation Bill has been passed by the Senate, and one amendment includes an increase from the House appropriation of $15,876,000 to $25,000,000 for naval aviation.

John M. E. Bowman, of the Biltmore, with Pilot James L. Wheeler, with whom he made his initial flight recently

Senator Lodge declared, in reply to Mr. King of Utah, who said it was too much money, that it would be wanton extravagance and not economy to refuse the increase for aviation. "Hydroplanes and naval aircraft form, and will in future form, a most vital part of the service," said Mr. Lodge. "To have a navy without adequate aircraft would, under modern conditions, be like cutting off an arm."

Use Hydro-Aeroplane to Study Eclipse of Moon

The eclipse of the moon was observed by Lieuts. J. H. Tilton and W. H. Cushing, of the Rockaway Beach Naval Air Station, at a height of nearly three and one-half miles. The two lieutenants ascended in a naval hydro-aeroplane N-9, remaining in the air one and one-half hours.

The observations were made at the direction of the Navy Department. Prof. David Todd, of Amherst College, assisted in the observations from the shore. Lieuts. Tilton and Cushing reported their observations were very satisfactory. They will be embodied in a report to be made by Professor Todd to the Navy Department.

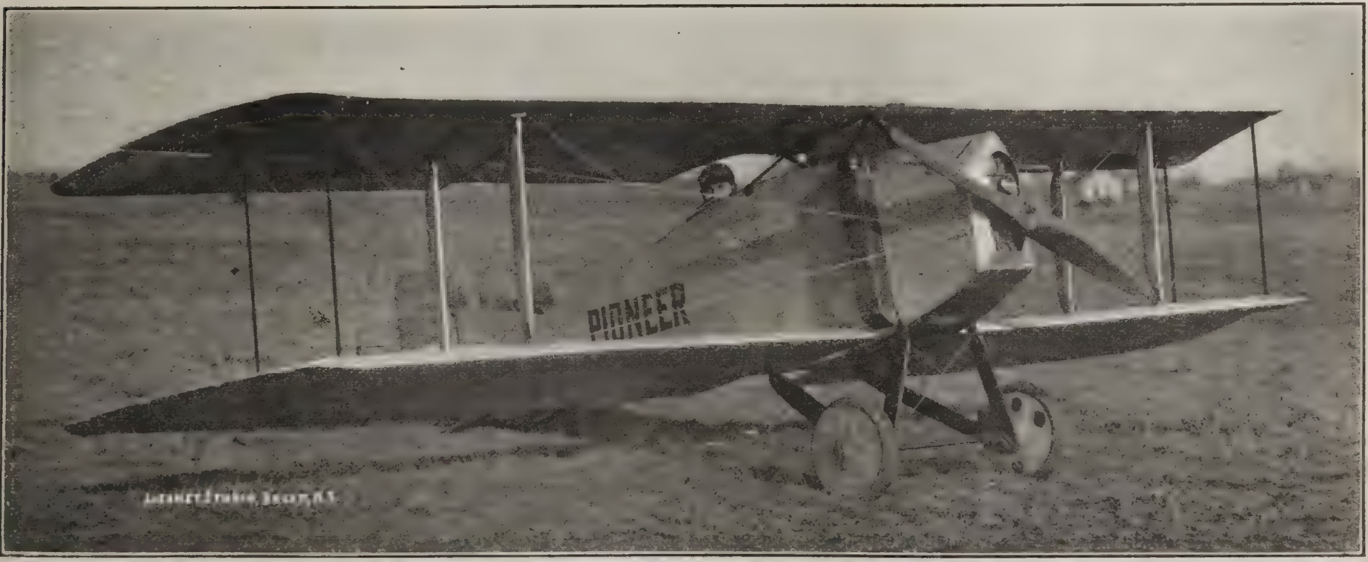
Decision Handed Down in Curtiss-Janin Suit

Albert S. Janin, a carpenter of Rosebank, S. I., won another skirmish in the legal battle for the ownership of patents on the construction of hydroplanes by a decision handed down April 30 by Judge Thomas I. Chatfield in the United States District Court in Brooklyn. The decision dismisses the contention of Glenn H. Curtiss and the Curtiss Corporation that they are entitled to the patents for flying boats, and confirms a decision previously made by the Circuit Court of Appeals of the District of Columbia in favor of Janin. The case will be taken to the Supreme Court.

Janin alleges that he got the idea for a boat with wings in 1899 when he saw flying fish and sea gulls. He applied for a patent on January 26, 1911, and filed a second application on August 9, 1911, in which biplane wings were used instead of monoplane wings as in the first model.

Curtiss filed his application for a patent for a hydroplane on August 22, 1911, and the legal fight started soon after. The primary examiner and the Commissioner of Patents decided in 1910 he had developed a canoe glider which failed to rise from the water only through lack of engine power.

Judge Chatfield stated that the Circuit Court of Appeals had decided that the Curtiss device did not reduce to practice any idea beyond that of a glider and that Janin had not shown lack of diligence in stopping work on his invention from 1909 to 1911.



Pioneer single seater Sport Plane, which made successful trials recently. It has a span of 24 ft., is 5 ft. 9 in. high, 16½ ft. long, and weighs 480 pounds. A 40 H.P., 4 cylinder vertical engine furnishes the power

Reorganize Aero Club of Minneapolis

A reorganization of the Aero Club of Minneapolis has been completd and at a recent meeting of the club the control of the affairs was definitely turned over to the flying and associate members. There are still sustaining memberships the same as in the original organization which, with the Associate memberships, offer an opportunity to those who are not flyers to join the club and assist in the financing and business management of same. It is the earnest desire of the present administration to make the Aero Club a real live club, one that will be active in aeronautic circles in the Northwest. A flying field on the site of the former speedway, midway between St. Paul and Minneapolis, has been obtained through the persistent efforts of the original Aero Club members, and a separate corporation, known as the Twin City Aero Corporation, has been formed to maintain this field and will have the co-operation of The Greater St. Paul Committee, of St. Paul, thus giving a permanent municipal landing field to the Twin Cities to be known as The Twin City Aviation Field.

The following officers were elected at the meeting of the club: Rufus R. Rand, Jr., President; Senator W. F. Brooks, retiring President, Vice-President; Paul Goldsborough, Secretary, and Harry C. Piper, Treasurer.

Gen. Brett Heads American-French Aero Exposition, Inc.

General Lloyd M. Brett, Regular Army, recently retired, has been elected president of the American-French Aero Exposition, Inc.

General Brett has had a very brilliant career during his forty-one years' service with the Army. He was awarded the Distinguished Service Medal and the French decorations of officer of the Legion of Honor and Croix de Guerre with palm for gallantry in the recent World War as a Brigadier-General and the Congressional Medal of Honor while a Second Lieutenant in the Sioux campaign in 1880.

The Exposition opened its season in New Orleans on March 20, 1920, and will begin its engagements in the North about the middle of May.

Major Schroeder Fit for New Altitude Test

Major R. W. Schroeder, who recently reached an altitude of 36,020 feet at Dayton. Ohio, has been pronounced fit to fly again by Major H. L. Bauer, head of the medical research department of the United States Air Service at Mitchel Field, Long Island. Major Schroeder was under observation of Major Bauer for several days and has undergone a number of heart tests. One of the tests included an "altitude test" of 30,000 feet. It was held in a special room designed to give identical conditions as exist six miles above the earth.

Immediately after Major Bauer's announcement Schroeder said he would make an altitude test with Sergeant Clarence Coombs in the four-seater Orenco biplane at Hazelhurst Field on the first clear day. This test is for pilot and three passengers.

Fly From New York to Tulsa, Okla.

The Spring season of commercial aviation in New York was opened with the departure from Roosevelt Field, Garden City, of Ray Cullman, of Jersey City, for Tulsa, Okla., in a Curtiss Oriole which he purchased from the Curtiss Aeroplane and Motor Corporation at the recent Aeronautical Show in New York.

Brig. General L. M. Brett, who has just been appointed president of the American-French Aero Exposition, Inc.

With Mr. Cullman as his mechanic was K. J. Dooley. Joseph Murphy preceded Mr. Cullman by one week as his advance manager to arrange for aerial photography, advertising and passenger carrying all along the route from New York to Tulsa. The itinerary of the flight includes Washington, D. C.; Raleigh, N. C.; Columbia, S. C.; Macon, Ga.; Montgomery, Ala.; Columbus, Miss.; Memphis, Tenn., and Fort Smith, Ark. From Tulsa, Mr. Cullman will proceed to the Pacific coast.

Every available space in the aeroplane in which they are making their long flight was taken up with their personal baggage. Such baggage as could not be squeezed into the two cockpits were lashed to the wings. One of the suit cases was torn from its moorings soon after starting from Garden City and was lost.

Both Mr. Cullman and Mr. Murphy were lieutenants in the United States Air Service, the former having official credit for downing one German plane.

Clifford B. Prodger, the famous test pilot who is now associated with the British & Colonial Aeroplane Co. in America, distributors of Bristol aeroplanes

Crew of R-38 Training for Transatlantic Trip

London.—Under command of Commander Louis Maxfield, fifty-five American air force officers and men have arrived in England and are undergoing a course of training before piloting the huge airship, R-38, which the United States has bought from Great Britain, across the Atlantic to New York.

The R-38 will be completed by September next and will cost more than $1,000,000.

The American crew will require a rigorous course of training, for nothing approaching the R-38 in size and cruising capacity has been produced in America.

Mae Murray Christens Curtiss Aero Limited No. 6

Inhabitants of Miami turned out in full force recently to witness the christening of the Curtiss Aero Limited Number Six by Mae Murray, the Paramount Artcraft star, who was there with George Fitzmaurice, her director, and David Powell, filming "Idols of Clay." The Curtiss people have maintained a fleet of twelve passenger planes in Florida this winter and Number Six is to be the first to make the flight to New York City. The other planes will follow at later dates.

Aircraft Tenders to Be Named Langley and Wright

Naming of two aircraft auxiliaries of the American navy in memory of Prof. Samuel P. Langley and Wilbur Wright in recognition of their pioneer work in the evolution of heavier-than-air craft was announced recently by the Navy Department.

The aircraft tender to be launched at the Hog Island yards next week has been named Wright and the name of the collier Jupiter, now being converted into an aeroplane carrier, has been changed to Langley.

Lt. Col. Barker Urges Commercial Flying

Montreal.—At the annual meeting of the Montreal Aerial League the league was visited by Lieut.-Col. W. G. Barker, V. C., the Canadian "ace."

Lieut.-Col. Barker is engaged in trying to promote commercial aviation in Canada for the carrying of mails and passengers. He stated that until provincial or municipal governments provided landing grounds and hangars there was little prospect of any extended air service in Canada, owing to the dangers of landing.

Transfers From Moving Train to Plane

Arthur Oakley, former commissioned flying instructor in the army, gave a very interesting demonstration of how a person could transfer from a moving train to an aeroplane in flight. The demonstration was witnessed from the air by a number of the officers from Ellington Field.

Mr. Oakley climbed to the top of the train, which was moving very fast, while the plane slowly crawled up on the day coach on which Mr. Oakley was standing. A suspension ladder was dropped from the fuselage of the aeroplane before the plane reached him. As this ladder moved close to Mr. Oakley he grasped it and was lifted from the train.

It is believed that this is the first attempt that has ever been made to transfer from a moving train to an aeroplane. Mr. S. E. J. Cox, oil magnate and aviation enthusiast of Houston, Texas, witnessed the demonstration from one of his own planes. The plane used was a Curtiss training plane belonging to Mr. Oakley.

The AIRCRAFT TRADE REVIEW

Lawson Air Line Co. Enlarges Plant

South Milwaukee, Wis.—The Lawson Air Line Co., 425 East Water Street, Milwaukee, has awarded contracts for a brick and steel assembling shop, 72x162 ft., at its aircraft works in South Milwaukee. It is building twenty giant aerial liners for transcontinental passenger and express traffic.

Ohio Flying Company Gets Five Planes

With its eighty-acre flying field in Stow Township, near Akron, complete, and its eight-plane hangar built, the Ohio Flying School and Transport Company, Inc., is now receiving its first five Curtiss JN-4 planes. Chief Pilot M. A. C. Johnson and General Manager John F. Aston are flying the JN-4's from Toronto.

The Ohio Flying School and Transport Company, Inc., is painting the roof of its big hangar a brilliant orange, following Government specifications, to give greatest visibility for transient aviators who wish to land on the Akron concern's field.

This company announces that it has booked over forty students for flying courses. Several contracts for exhibition and advertising in the local field have been closed.

A Curtiss F-boat has been purchased by the Ohio Flying School and Transport Company, Inc. It is under contract to fly this summer at a local lake in connection with a pleasure resort. It is the first flying boat this Akron territory ever saw.

Use of Aeroplanes Demonstrated By Memphis Aerial Company

The Memphis Aerial company is one of the many progressive distributing companies that are now handling Curtiss aeroplanes and flying boats. It was organized during the last year and its officers are: G. G. Garrison, president; William F. McMorrow, vice-president; John L. Day, secretary and treasurer; O. C. Francis, general manager; J. S. Marriott, chief pilot; Dr. L. Levy, flight surgeon.

During the last month the company made one of the most pretentious demonstrations of the commercial uses of aeroplanes that has ever been undertaken. Five planes were chartered by the Memphis *Press* to deliver that publication to subscribers in Clarksdale, Miss.

Three Curtiss Orioles, piloted by Joseph Marriott, with H. M. Johnson, circulation manager of the Memphis *Press,* as his passenger; pilot G. G. Garrison; and pilot W. J. O'Sullivan, with R. N. Wasson, editor of the Layne and Bowler Waterworks Company's *Field News,* as passenger, made the trip. One of the Orioles is owned by the Layne and Bowler company and used by them in business.

The two other machines were Curtiss JN-4D's, one owned and operated by "Loop King" Murphy, and the other owned by the Layne and Bowler company and operated by Lloyd Lane.

In addition to making the first large aerial newspaper delivery ever made in the South, the trip also marked the opening of the municipal landing field at Clarksdale and the establishment of a branch of the Memphis Aerial Company there.

Ford to Build Aircraft

Lansing, Mich.—Formal notice of the proposed reorganization of the Ford Motor Company and other interests of its stockholders was filed with the Secretary of State. The papers indicated that the automobile and tractor businesses will be consolidated and reincorporated as a $100,000,000 Delaware corporation.

The corporate powers of the new company will permit it to manufacture aircraft, internal combustion locomotives and railroad cars and to continue the automobile, truck and tractor business now conducted separately.

It has been known for some time that Henry Ford intended to undertake the development of aircraft.

Consulting Dope Expert

Georges Voisin, who has been practically interested in aircraft construction for the last fifteen years and who until recently has been in charge of the doping departments of various American aircraft companies, has now established his own business and is offering his services as a dope expert to companies and individuals. Mr. Voisin has been an instructor on the subject in some of the Government schools and recently he was in charge of this work with the Wittemann-Lewis Aircraft Corporation, and the Interallied Aircraft Corporation.

Inter-State Airplane Co. Buys Payne Field

The Inter-State Airplane Company of Dallas, Texas, recently purchased eighty acres of land and a part of the hangars and buildings of what was formerly Field at West Point, Mississippi.

The field will be used as a base for the company's operations in Mississippi, from which additional activity in aviation will be encouraged for that section and an effort will be made to have the various cities establish municipal flying fields, and to accommodate the large passenger aerial cruisers that the Inter-State Airplane Company plans to put into commission soon.

The first aerial line to be established by the company is expected to connect Shreveport, Dallas, Ft. Worth, Wichita Falls, all of which cities are headquarters for oil operations. On account of the speed which is necessary in oil business this "Oil Man's Aerial Special," is assured much patronage. One large twin-motored plane capable of carrying more than a dozen passengers has already been ordered for this line and a delivery is promised early this spring. If the plans of the company are carried out, this line will be but a small part of the network of air lines expected to follow in close succession. The greatest delay at this time, is understood to be the inability to get delivery on the large planes.

The field purchased in West Point, Mississippi, will be marked with official markings and will be open to all aeroplanes for service and storage, according to announcement made by Mr. Carroll G. Taylor, secretary of the Inter-State Airplane Company.

Assembly and storage room of James Levy Aircraft Company of Chicago

AERONAUTICAL CAMOUFLAGE

By WM. R. WEIGLER

Chief of the Camouflage at McCook Field

CAMOUFLAGE is a definite thing. When applied to air machines of war it increases their effectiveness and efficiency, prevents the loss of planes in combat and protects the lives of pilots.

The factors entering into the correct solution of the camouflage problem are the functions of the plane, its visibility and psychological effect of this deception or camouflage on the human mind. Aircraft generally function as either day or night machines. They are painted so as to be low in visibility or to confuse the mind. Whether or not camouflage itself is effective depends upon the elimination or distortion of the shadows, the use of the correct color, with the proper light absorption and reflecting qualities.

Certain scientific facts have been established in relation to camouflage. Measurements have been taken over large areas of terraine with the view of obtaining reflection factors of light from various sources. Other measurements which will give in terms of wavelength of light and thereby defining definitely the color of the reflected light from fields, water, etc., are proposed so that camouflage no longer is a purely artistic endeavor, but becomes a subject based on a thorough study of scientific facts and data.

Camouflage or protective coloration exists in nature to a very great extent. The design of aircraft camouflage closely follows one or two of these natural examples, namely, color schemes of the snake or fish. Both are round in form and in general have two distinct systems of coloration, one on the top, a mottled colored pattern and the other on the under side, a light tone of color, blending on the sides so as to eliminate all shadow effects. Probably the closest example is the fish, with its dark or colored back, which is seen in comparison with the dark water and stream bottoms, while on the other hand light colors are found on the under sides which blend with the lighter colors of the water when viewed from beneath.

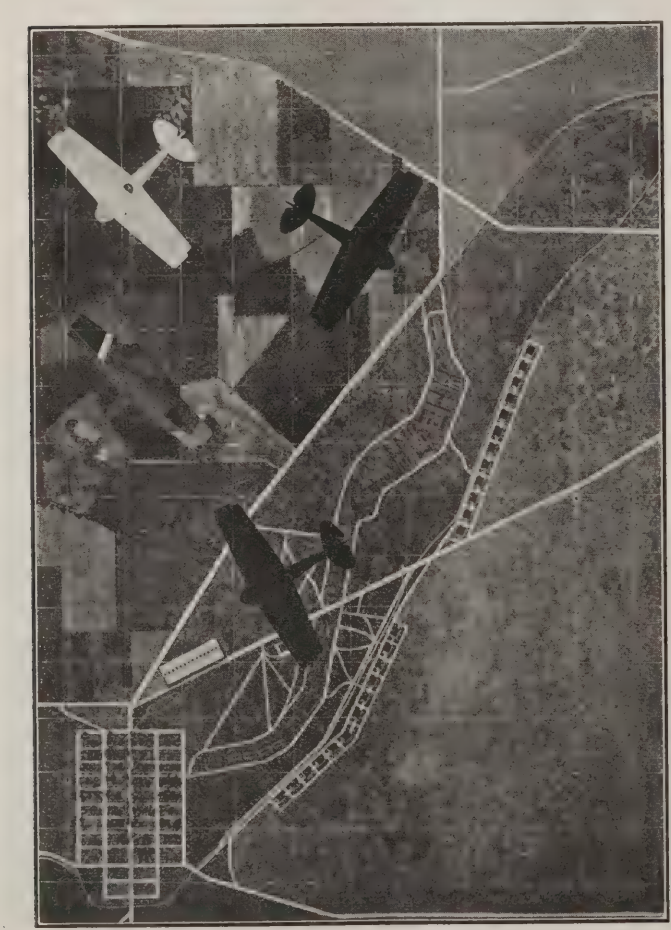


Fig. 1

Aircraft functioning during the day should be protected by a double system of camouflage. In going to and from active duty it is often necessary for the plane to travel over considerable distance during which time the plane is generally in a horizontal position; therefore, when seen from below the plane is silhouetted against the sky as a background. The lower or under surfaces of the plane are of course in shadow. It is, therefore, necessary that all under surfaces of such planes be coated with some material that would be as bright as possible and would reflect back to the earth not only a large quantity of light, but also the color of the sky. If the camouflage could equal in brightness and color that of the sky, we could safely say that we have produced low visibility of the plane when seen from below. We have in this manner protected it from enemy planes flying beneath it and from anti-aircraft guns over which it must pass. Of course the complete invisibility just described is ideal and does not exist, but it has been worked out on models under conditions which approximate those illustrated above with the result that a plane that would normally disappear at an altitude of 20,000 feet so camouflaged would disappear at 15,000 feet, thus giving the plane the range of invisible activity of 5,000 feet. This is an enormous advantage for aircraft operating under war conditions, as it places the pilot of the plane in a position to observe without being observed with the additional advantage that a plane can operate with a greater load if the ceiling at which it must travel can be lowered.

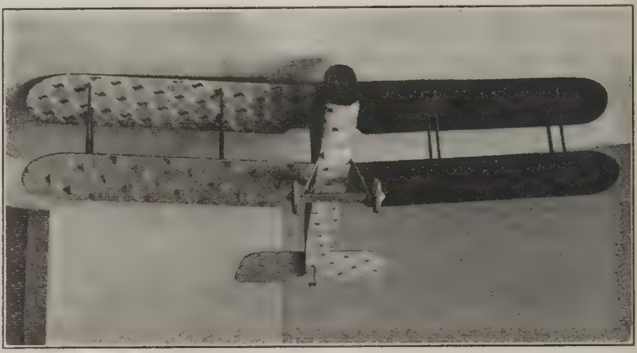


Fig. 2

The second phase of camouflage development considers the plane as seen from above with the earth as a background. In order to obtain low visibility, it is necessary to apply a coat to the plane which will have the property of making it merge or fit into this earth-colored background. The prob-

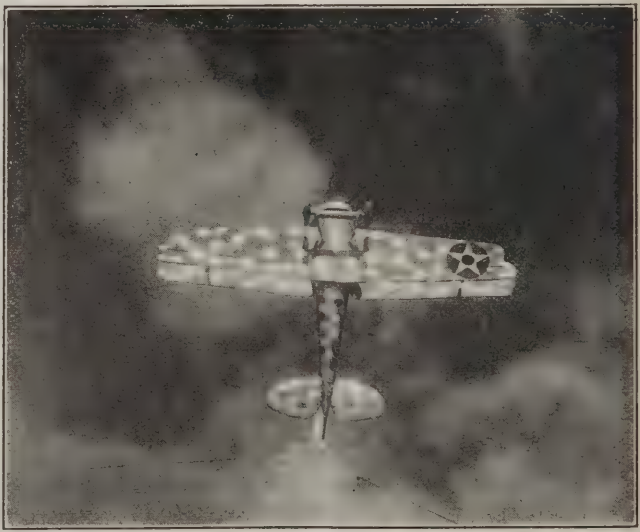


Fig. 3

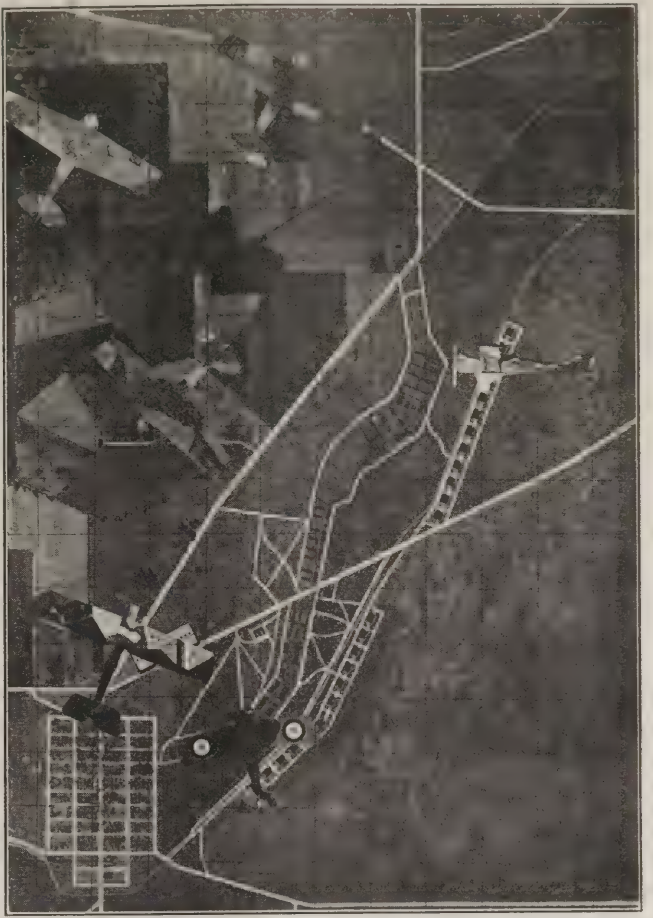


Fig. 4

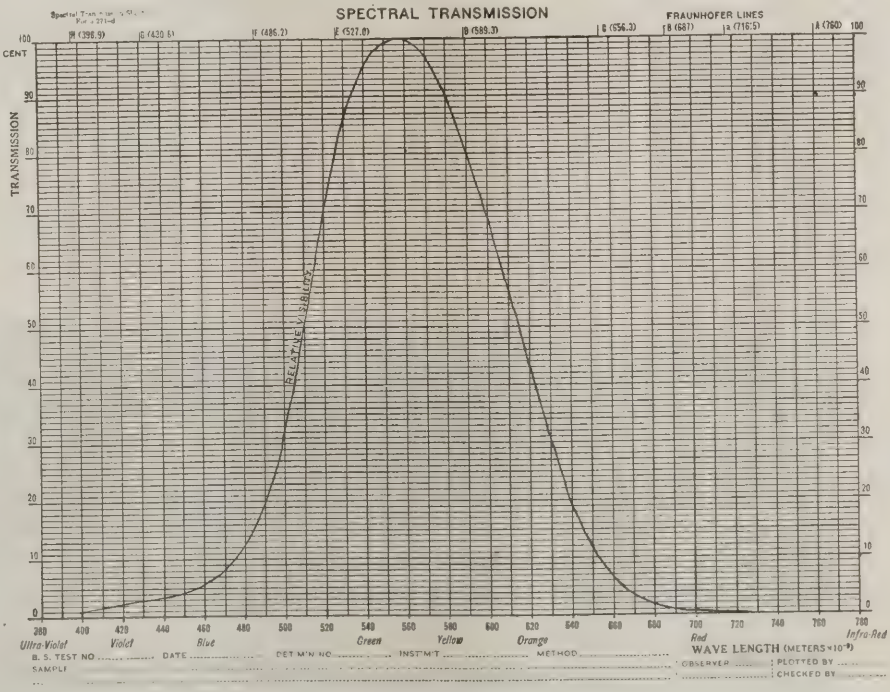
lem is not easy, as plane moving over country is continually changing its environment. At one time a clump of trees or woods forms its background and another a green field or a body of water. All these must be taken into consideration, and the final coating must contain that color which fits the greatest number of these conditions. Low visibility in this case means that the enemy planes which fly high could not observe the low flying planes and therefore would be at a disadvantage. Also that planes so camouflaged would not be targets for bombs when preparing for formations in front of hangars. A great deal of work has been done on upper surface camouflage, both here and abroad and much confusion has developed over its use or absence. The mean value of color as scientifically measured over a large area of terraine when properly painted gives a dark greenish color, somewhat darker and greener than ordinary khaki. Greenish yellow with a wavelength of about .556 μ is the most visible color to the human eye. It can readily be seen if a plane is painted in khaki it would be far less visible than those done in clear dope and varnish which is a yellow color. Sufficient progress has been made in the manufacture of pigmented dopes which dry with dull matt surfaces to warrant their use as wing coverings. In this manner camouflage can be applied without additional weight and with added protection to the fabric. Also by controlling the portion of oil in the coating the light reflection factor can be increased or decreased at will.

In any system of coloration the background against which the plane is silhouetted is a controlling factor of the color and design used to obtain high or low visibility. It can readily be seen that there is greater contrast between a white object and a black screen than in a dull gray object and a similar screen. It is, therefore, obvious that a plane can be made more or less visible by a coat of paint. In order to obtain definite information upon which to base the correct or lowest visible colors or combination of colors, the best suited for camouflage of a plane in, that is to say, the temperate zone, a color survey of the territory must be taken and the following factors measured. Hue, saturation and brightness—the mean of each of a series of these values, must be then determined for the locality in which the plane will operate and a camouflage design with that color which when analyzed more nearly matches the average of the above factors. So far the only measurements made from a plane at various altitudes have been in terms of white light. These measurements pave the way for further investigations in the matter of color of the earth's surface when viewed from a plane at various altitudes and under different atmospheric environment.

Camouflage deduced from science not only deals with the factors of light, but with the physical act of translating this light into sensation or the action on the retina and with the psychological effect produced by this sensation through the mind. The human element, therefore, enters into this field of endeavor to a very large extent and for this reason the curve reproduced herewith was plotted by the Bureau of Standards which shows in term of wavelength of light and amount of transmission the effect of visibility of various colors when seen by the human eye. As this curve shows the most visible color is a greenish yellow with a wavelength of .556μ, it must be understood that this does not imply that a greenish yellow is the most visible color at all times, for as pointed out before the environment of colors plays a very important part in the visibility of that color and it can readily be seen that a greenish yellow square of paper, if placed on a background of the same color, will become invisible and merge into that background much quicker than a violet piece; here actual visibility is near the bottom of the curve.

As shadows bear a direct geometric relation to the object which cast them, they often reveal a body when it otherwise would be concealed. Due to the reduction of light in the shadow, a line or edge casting it very often stands out in peculiar contrast. Often a building that has been completely camouflaged and which otherwise could not be detected is seen quite distinctly by the enormous contrast formed by itself and the shadow it casts. Many objects need only a suggestion of what they are to associate them with the actual object. This is true of objects with which we are familiar, for the mind, by the aid of memory and imagination, forms concepts as to the true shape and size of the object thus partially observed. Thus when a plane, even though the system of protective coloration is perfect, casts a shadow of itself on a bright sandy beach, the mind would immediately detect

(*Continued on page* 300)



Curve plotted by Bureau of Standards which shows in term of wave length of light and amount of transmission the effect of visibility of various colors when seen by the human eye

THE BOULTON & PAUL COMMERCIAL MACHINE

GENERALLY speaking, the Boulton & Paul Commercial biplane may be said to be similar to the machine built by this firm for the Transatlantic flight. The deep *fuselage* extends right up to the top plane, thus giving ample accommodation inside for passengers or packages. Since, however, the main fuel tanks are mounted inside the body, the cargo or passenger space is divided into two separate compartments, one in front of the tanks and one aft of them. As at present fitted up, the machine is not provided with its full complement of seats, etc., as it is intended to obtain a certain amount of experience with her in the air before finally deciding upon the arrangement of seats. Also the arrangement will be largely dependent upon whether the machine is to be used for passenger flying, for carrying mails, or for a combination of the two. It will, therefore, be understood that this part of the design is still left open, so to speak, and is subject to alterations as requirements demand. Obviously there is a wide choice according to the use to which the machine will be put. For instance, by fitting relatively small tanks and installing a large number of seats, the P.8, as this machine is called on the B. & P. series list, will be able to carry a large load for a relatively short distance. On the other hand, the tank capacity may be increased and mails substituted for some of the passengers. Or, again, all passengers and mails may be left out, the whole carrying capacity being taken up by fuel, in which case the machine would have a very long radius of action.

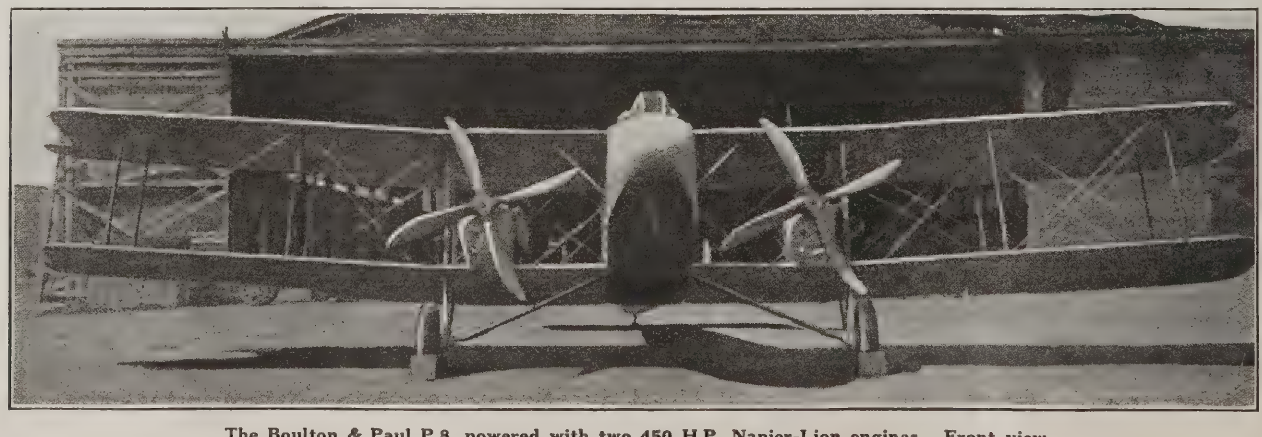
Constructionally, there are no great innovations to be found in the P.8, most of the constructional details being of more or less standard type. It might be pointed out, however, that very extensive use has been made of tubular rivets in place of threaded bolts. This method of securing parts has been found very economical, both as regards strength for weight and in the actual use, the tubular rivets being quick to make once the proper tools for their manufacture have been installed, while replacements take little, if any, longer than would the replacement of a bolt. These tubular rivets are employed for securing the metal fittings to the *fuselage longerons*, and in many other places in the body and undercarriage. They make a very neat job, as there are no boltheads or nuts projecting, but only a thin bell mouth where the ends are flanged out. Apart from the use of these rivets, the *fuselage* is of standard construction, with *longerons* and struts of wood, the structure being cross-braced with standard tie rods. In the front part this simple arrangement is varied occasionally as local requirements demand, but, fundamentally, the *fuselage* structure is of the simple girder type. One feature of the *fuselage* design should be pointed out. The upper *longerous* do not run along the top corners of the body, but are placed some distance down the side. As a matter of fact, the top *longerons* run straight, in side elevation, thus forming a good datum line for rigging and truing-up purposes. From this it will be seen that only the lower part of the *fuselage* is braced, the upper portion being merely a fairing made up of formers and longitudinal stringers.

As already pointed out, the main fuel tanks are mounted in the body, and as they are placed over the centre of pressure of the wings, so as not to alter the trim when the fuel is consumed, they divide the available space into two separate compartments. When fitted out as a passenger carrier, both front and rear cabins may be fitted with seats. Owing to the deep body and the possibility of placing the petrol tank high in the body, there is no need for any gravity tank, the main upper petrol tank performing this function. If more tanks are fitted for long duration work, some of them near the floor of the body, it will probably become necessary to provide means for transferring the fuel from these into the top tank, but at present the petrol system is simplicity itself, with gravity feed direct from the main tank.

In the fore part of the body, in front of the fore cabin, is the pilot's cockpit, the wind screen for which is so arranged that if desired the pilot can have his head projecting into the open without being in a direct draught, while if desired, he can close a small skylight and be totally enclosed, as are the passengers. From this position he retains quite a good view in practically all directions except straight back, and as the machine is very fast—about 150 m. p. h.—he need not worry much about machines overtaking him. Lateral control is by means of a wheel, and a fore and aft movement of the wheel operates the elevator. Rudder control is normally by foot bar, but by a very ingenious arrangement it is possible during a long flight to lock the *ailerons* and elevator in position and steer the machine by the wheel. The change-over from foot bar to wheel steering is done with one movement. The wheel is so held that the *ailerons* and elevators are neutral and, with the wheel and column in this position, the locking lever is pulled. This locks the lateral and longitudinal control surfaces while at the same time disengaging the foot bar and connecting the rudder cables to the wheel. As the machine is expected to be very stable, this should be a considerable advantage on a very long journey. The controls are instantly returned to the normal by pulling the locking lever in the opposite direction, an operation requiring a fraction of a second only. For use when one engine is pulling slightly more than the other, there is an arrangement for taking the load thus imposed off the pilot's feet. This consists of a small wheel mounted on the right-hand side of the control column, near the top. Pressing the wheel inwards causes it to engage with the rudder control cables, and turning the wheel then puts one rudder cable under tension, the amount depending upon the number of turns given to the wheel. In this manner the pilot does not have to be pressing constantly with his right or left foot, according to which engine pulls the harder, and the springs incorporated with the control cables ensure that for steering the rudder is as easy to move as if it were central. In case of total failure of one engine, the turning effort made possible by this arrangement would be insufficient, and provision has been made for this contingency by pivoted fins above and below the tail plane, operated by a wheel on the starboard wall of the pilot's cockpit. The usual tail plane trimming gear is provided, also actuated by a hand-operated wheel.

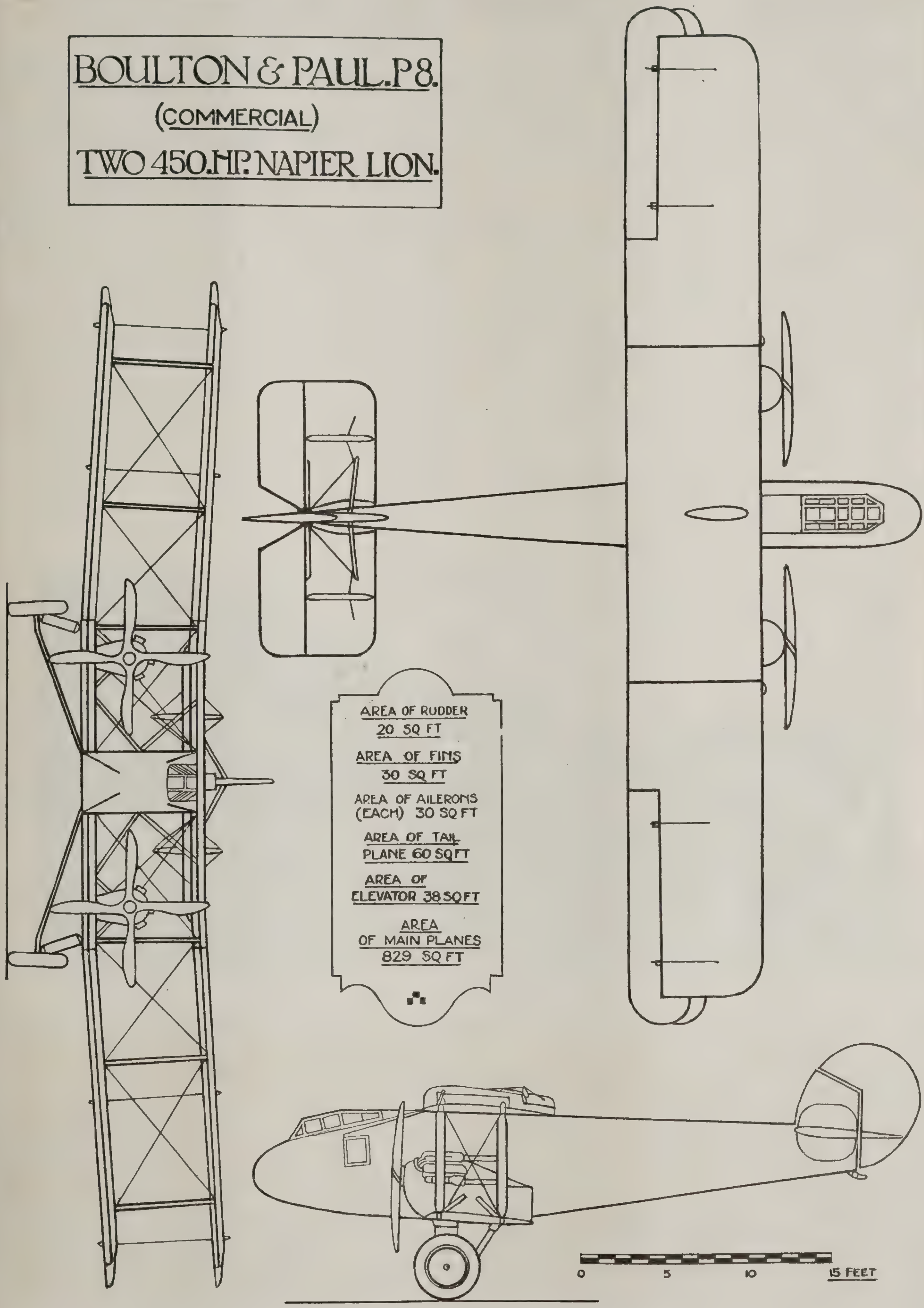
The engine controls consist of two sets of duplicate levers. A rear set is for ordinary engine control, the right-hand lever being the throttle for the starboard engine, the left-hand one for the port engine. The front pair is for altitude control, Both engines may be throttled together or separately, by moving the two levers together or singly.

As will be seen from the general arrangement drawings and photographs of the machine, the engines are enclosed in neat aluminum casings, giving a very low resistance. This has been made possible by fitting the radiator in the *fuselage*. To vary the cooling the radiator is mounted on two vertical worms which can be rotated from the pilot's seat by means of a wheel *via* chains and cables. A header tank is placed in the top plane, connected to the radiator by means of a flexible rubber pipe. This pipe is arranged in a series of zigzags so



The Boulton & Paul P.8, powered with two 450 H.P. Napier-Lion engines. Front view

BOULTON & PAUL. P8.
(COMMERCIAL)
TWO 450.HP. NAPIER LION.



as to allow of the raising and lowering of the radiator without getting kinks in the tube. Although the single radiator is not partitioned off, the water system of either engine can be cut off during flight. The water pumps on the engines draw the water from the bottom of the radiator, force it through the water jackets and hence up to a small tank in the top plane. From this it runs down a pipe to the side of the radiator. Here the water is not allowed to mix at once with that already in the radiator, but has to flow over the top of a small partition near the side of the radiator. The pipes leading from the radiator to the engine, and the return pipes from engine to radiator, are provided with cut-off valves, placed under the bottom of the *fuselage* and connected to controls in the pilot's cockpit.

The main planes, of which the top one has a chord of 8 ft., while the bottom plane chord is 6 ft. 6 ins., are of standard construction. The spar fittings are very substantial and all the struts are pin jointed. Balanced *ailerons* are fitted to both top and bottom planes.

The 450 h.p. Napier Lion engines are mounted on the bottom planes, the engine beds being of light although very strong design. The vertical supports of the engine bearers are in the form of a framework of wood, covered with three-ply. From the engine bearers diagonal tubes run outwards and downwards, providing a perfect system of triangulation, which is extended inwards by tubes running from the bottom plane spars to the upper *longerons* of the *fuselage*. The whole engine mounting has been very well thought out, care being taken to ensure that there are no offset moments. The consequence is that there is a marked absence of vibration under all conditions.

The oil tanks are mounted behind the engines. Mounted on the trailing portion of the bottom plane, behind the oil tank, is a hand-operated starting magneto for starting the engine when the machine is on the ground. The engine housing is in the form of sheet aluminum.

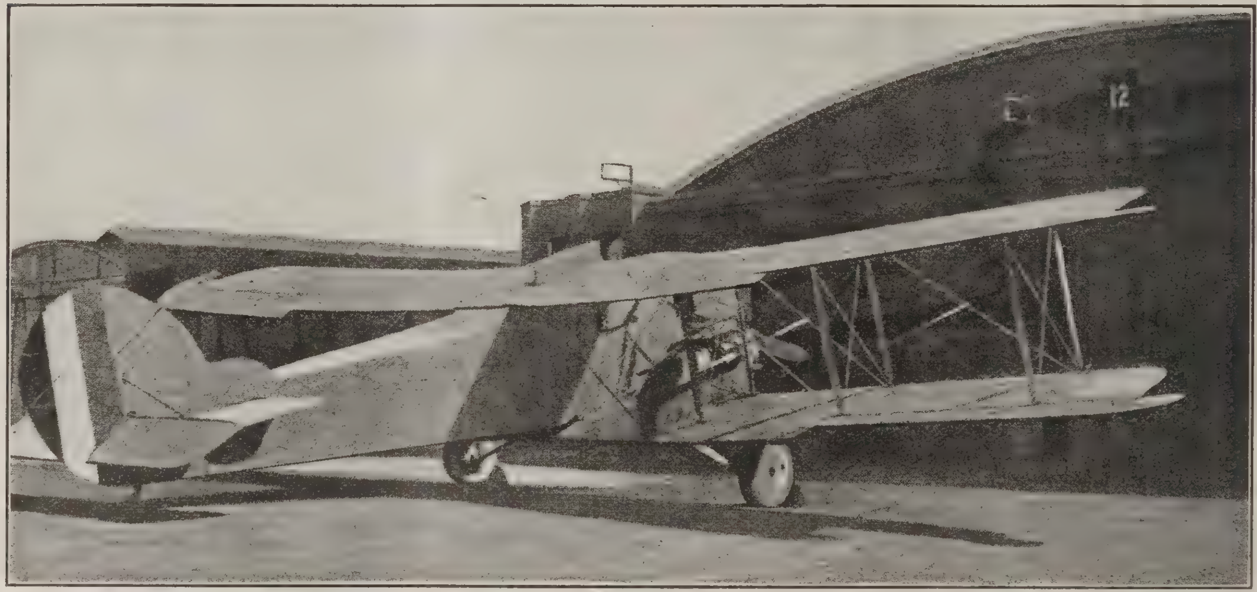
The undercarriage is in the form of two simple "Vees" of wood, hinged laterally to the bottom wing parts. The two axles are of the bent type, hinged at their inner ends to the bottom *longerons* of the *fuselage*, and carrying at their outer ends the Palmer Cord wheels. Springing is partly by shock absorbers of rubber and partly pneumatic.

The control surfaces are of standard type, the rudder being balanced. The tail plane, as already mentioned, is of the variable incidence type for purposes of trimming the machine, and the only respect in which the tail differs from usual practice is in the fitting of two pivoted fins, above and below the tail plane, which serve to balance the turning moment set up when one engine is out of commission.

The aerodynamical features of the P.-8 have been thoroughly tested in the wind tunnel of Messrs. Boulton & Paul's experimental department, especial care being taken to ensure good stability, as this is a very important point in a commercial machine designed for long-distance flights. Special apparatus have been designed to facilitate the determination of rotary derivatives, and a great amount of stability work is being done by the B. & P. wind tunnel staff. When, therefore, this firm places a machine on the market it may be taken for granted that every effort has been made to ensure that she is absolutely "right," having that degree of stability which relieves the pilot of the greater part of his work on a long flight, without having the excessive stability that may cause a machine to "take charge" at a time when manœuvrability is required.

The main particulars of performance, etc., are as follows:

Weight, empty	4,000 lbs.
Weight, loaded	7,000 lbs.
Speed at 10,000 ft.	149 m.p.h.
Speed at 15,000 ft.	142 m.p.h.
Climb to 10,000 ft.	8 mins.
Climb to 15,000 ft.	15 mins.
Ceiling	25,000 ft.
Load/sq. ft.	8.4 lbs.
Load/h.p.	7.7 lbs.



The Boulton & Paul P.8 Commercial Machine. Three-quarter rear view

RESISTANCE TO DECAY NOW A FACTOR IN CHOICE OF AEROPLANE WOOD

Aeroplanes in the past have been so short-lived that it has mattered little whether the wood in them was resistant to decay or not. Now with better construction and less accidental breakage of aeroplane parts, instances are coming to the attention of the Forest Products Laboratory of parts needing replacement because of decay.

The fact is being recognized that many woods in common use for aeroplanes are not resistant to decay and may be destroyed very rapidly when exposed to unfavorable weather conditions.

Fortunately, there are woods whose value in aircraft has been demonstrated which are highly durable. Among these perhaps the most notable is Port Orford cedar. Two others which in tests made by the laboratory have proved very resistant to decay are southern cypress and California redwood. Douglas fir, white oak, and black walnut stand fairly high in durability. Mahogany and Spanish cedar are reputed to be very durable, but no tests have been made on them in the United States. Spruce, which has been the favorite wood for aircraft, is, unfortunately, appreciably less durable than any of the species mentioned. Likewise basswood, beech, birch and maple may be classed with the less durable species.

The sapwood of practically all species decays readily. Hence in selecting wood for durability, only the heartwood should be accepted.

In cases where it is not practicable to use a naturally durable wood, the life of the wood part may be prolonged by giving it a preservative treatment. Sodium fluoride is a preservative which may be successfully used on parts that are to be glued. Coal-tar creosote, where its color and odor would not be objectionable, may be used for parts that are not to be glued. Decay in struts, propellers, and some other large members can be prevented by applying a coating of aluminum leaf. This keeps the wood dry, and dry wood does not decay.

SOME OF ATLANTIC CITY'S LEADING HOTELS

ATLANTIC CITY is the world's premier pleasure and health resort. Taken all the year round it has no equal. Some European resorts rival it for a limited winter season, but none compare in popularity, comfort, pleasure and health-giving qualities the four seasons through. On Absecon Island, ten miles in length and less than a mile in width, extending nearly due east and west, separated from the mainland by five miles of salt bays and meadows, Atlantic City faces the south. The prevailing southwest breeze of summer comes to it cooled by the ocean, while in winter its southern exposure and proximity to the Gulf Stream and the protection of the Jersey pine belt insure an equable climate several degrees warmer than nearby New York and Philadelphia.

Following is the rate schedule for May:

		RATES BY THE DAY							
	A—American Plan E—European Plan	Rooms without Private Bath				Rooms with Private Bath			
		For One Person		For Two Persons		For One Person		For Two Persons	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Boardwalk	A—Royal Palace	7.00	9.00	12.00	16.00	10.00	15.00	18.00	25.00
	A—Breakers	7.00	8.00	14.00	18.00	9.00	14.00	16.00	25.00
	E—Breakers	3.00	4.00	7.00	10.00	5.00	10.00	8.00	16.00
	A—St. Charles	7.00	8.00	12.00	13.00	9.00	16.00	14.00	20.00
	A—Blackstone	6.00	8.00	11.00	12.00	8.00	10.00	12.00	16.00
	E—Blackstone	2.00	4.00	4.00	6.00	4.00	6.00	6.00	8.00
	A—Seaside	7.00	8.00	14.00	16.00	....	....	16.00	18.00
	A—Haddon	7.00	9.00	12.00	14.00	9.00	11.00	14.00	20.00
	A—Chalfonte	7.00	9.00	13.00	14.00	9.00	11.00	14.00	20.00
	A—Alamac	8.00	9.00	14.00	16.00	10.00	12.00	16.00	20.00
	E—Alamac	4.00	5.00	6.00	8.00	6.00	8.00	8.00	12.00
	E—Apollo	2.00	....	3.00	4.00	3.00	....	5.00	6.00
	A—Traymore	9.00	....	14.00	....	10.00	....	16.00	....
	E—Traymore	5.00	....	6.00	....	6.00	....	8.00	....
	A—Brighton	8.00	10.00	14.00	16.00	10.00	18.00	16.00	22.00
	A—Marlborough-Blenheim	8.00	9.00	14.00	....	10.00	14.00	16.00	25.00
	E—Marlborough-Blenheim	5.00	6.00	7.00	....	7.00	11.00	9.00	18.00
	A—Dennis	7.00	8.00	11.00	12.00	10.00	14.00	14.00	21.00
	E—Shelburne	3.00	4.00	5.00	6.00	5.00	7.00	10.00	12.00
	E—Ambassador	....	....	....	....	5.00	14.00	7.00	16.00
	A—Chelsea	7.00	9.00	14.00	16.00	9.00	12.00	16.00	20.00
Oriental Avenue	A—Touraine	4.50	....	9.00	....	6.00	....	10.00	....
	E—Touraine	3.00	....	4.50	....	4.00	....	5.00	....
Massachusetts Avenue	A—Phillips House	5.00	6.00	....	....	6.00	6.50	....	....
St. Charles Place	A—Loraine	5.00	6.00	10.00	12.00	....	....	14.00	16.00
	A—Raleigh	4.00	5.00	8.00	9.00	6.00	....	10.00	12.00
	E—Raleigh	1.50	....	3.00	....	2.50	....	4.00	....
Maryland Avenue	A—Goodfellow	5.00	6.00	8.00	10.00	....	....	....	12.00
	E—Goodfellow	3.00	....	4.00	....	....	....	....	7.00
	E—Schafer Villa	3.00	....	5.00	6.00	....	....	....	....
Virginia Avenue	A—Clift	4.00	....	8.00	....	5.00	....	10.00	....
	E—Clift	2.00	....	3.00	....	3.00	....	6.00	....
	A—Majestic	4.00	5.00	7.00	8.00	....	....	12.00	16.00
	E—Majestic	2.00	3.00	3.50	4.50	....	....	8.00	10.00
	A—Grand Atlantic	4.00	5.00	8.00	10.00	....	7.00	12.00	14.00
	E—Grand Atlantic	2.00	3.00	....	....	....	....	....	....
	A—Bothwell	5.00	6.00	10.00	12.00	....	....	12.00	14.00
	A—Wiltshire	4.00	5.00	8.00	10.00	6.00	7.00	12.00	14.00
	A—Morton	5.00	6.00	10.00	11.00	7.50	8.00	13.00	14.00
	A—Shoreham	3.50	4.50	7.00	9.00	4.50	6.00	9.00	12.00
	E—Shoreham	1.50	2.50	2.50	4.00	2.50	4.00	3.50	5.00
Pennsylvania Avenue	A—Dudley	4.00	5.00	7.50	9.00	....	....	10.00	12.00
	A—St. Clare	4.00	5.00	8.00	10.00	....	....	12.00	14.00
	A—Upton	3.00	3.50	5.00	6.00	....	....	....	....
North Carolina Avenue	A—Colonial	3.00	4.00	5.00	6.00	3.50	5.00	6.00	7.00

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. *It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages.* AERIAL AGE *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in AERIAL AGE *for February 9th and 16th and by Mr. Hughes in his* 1918 *investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

On July 15, 1918, or two and one-half months after the previous notice, Maj. A. C. Downey, head of the Contracts Department, Finance Division, Bureau of Aircraft Production, also wrote Maj. Brown as follows:

> The contract section has endeavored to assist and co-operate with the Spruce Production Division and had disapproved of certain contracts in order that their disbursing officer might be protected. They have apparently not relished this method of treatment and have recently taken the matter clear up with the view of forcing the contract section to approve the contracts which had previously been returned unapproved. In view of these facts, it would occasion no grief to the contract section if Mr. Ryan should delegate to Col. Disque full authority to approve all contracts executed by the Spruce Production Division.
>
> However, until such time as this authority is granted the contract section will continue to adhere to its former policy, to wit, in that it will not approve of any contracts which are of such character as to indicate in any way that the interests of the Government of the United States are not being subserved (p. 2164).

Special attention was thus called to three cost-plus contracts made by Disque to Grant Smith-Porter Bros., Warren Spruce Co., and the Airplane Spruce & Lumber Co., amounting to $13,000,000 each, or a total of $39,000,000. None of these contracts received the approval of the Chief Signal Officer, nor were they submitted to any official in the East authorized to act in such matters (p. 2165).

Col. Disque had no legal authority to sign or approve any contracts in excess of $5,000 without the approval of his superiors in authority. This was testified to by spruce production officials (p. 2165).

$19,000,000 Wasted On Four Cost-plus Contracts

Without authority, Col. Disque gave these three cost-plus contracts for $39,000,000 to the contractors named early in 1918, only one of whom had any experience in the logging or lumbering business. These contractors furnished about 11,000,000 feet of riving material prior to April, 1918 (p. 1509). No logs or lumber furnished by any of the cost-plus contractors reached the mills during the six or seven months thereafter, although they were continually making preparations. Apart from about 7 per cent of the 1918 airplane lumber produced by riveting methods and received from these cost-plus concerns, all the lumber or cants were produced by independent operators and in September, 1918, more lumber was being furnished by private individuals than all the Allies combined could use.

In settlements made by Col. Disque after the war four cost-plus contractors received payments from the Government of over $19,000,000, as follows (p. 2857-2858):

Airplane Spruce & Lumber Co.	$1,664,576
Grant Smith-Porter Bros.	3,349,903
Warren Spruce Co.	5,671,237
Siems-Carey-H. S. Kerbaugh Corporation	8,329,652
Total	$19,015,368

Distribution of Soldiers

Col. Disque's farming out of soldiers to the cost-plus contractors is shown by his own statement (p. 1690), which gives distribution as follows:

	Soldiers	Officers
Airplane Spruce & Lumber Co. (Grays Harbor)	5,251	173
Grant Smith-Porter Bros. (Clatsop district)	3,252	90
Warren Spruce Co. (Yaquina Bay)	3,298	72
Siems-Carey-H. S. Kerbaugh (Puget Sound)	4,736	140
Coos Bay	839	31
Portland headquarters (officers and men)	500	....
Vancouver cut-up plant (officers and men)	4,000	....
Total	21,876	506

(The remaining officers and men were at Vancouver Barracks.)

The total Disque army reached about 30,000. Remembering that Col. Kelly was lumbering in France with approximately an equal number of soldiers, it is significant that Kelly had not to exceed 10 officers at headquarters of combined regiments and 12 to 14 enlisted men (p. 2317). Col. Disque testified that he had 500 officers and men at his Portland headquarters, not counting several thousand more at Vancouver Barracks, across the river from Portland.

Soldiers Were Unnecessary

In view of Pendleton's Canadian production in eight months, under manifold difficulties, any competent lumberman, by organizing existing forces of the Northwest, without any soldiers could have produced, if necessary, a half billion feet of spruce and fir for aeroplanes in the year Col. Disque operated, and at a saving of $19,000,000 in cost-plus contracts. Co-ordination of 100,000 men who produced over 5,000,000,000 feet of fir and spruce lumber in 1917 would have met every requirement several months before orders were received by Col. Disque to retard production.

A mere statement of accomplishments by Col. Kelly and Mr. Pendleton in France and Canada, compared with the enormous resources in existence in this country, carries its own conviction. Sixteen million feet per month, or only about double that produced by Canada in November, 1918, was more than enough aeroplane lumber to supply the Allies, and that was produced by independent operators here in September, 1918, with a novice clogging the work. This shows what might have been accomplished in half the time and at comparatively small expense by a man who knew the business. Testimony of witnesses on this point is superfluous, but is offered to complete the record. (Pendleton, p. 1258; Kelly, p. 2316.) Mr. Chinn, secretary of Puget Sound Loggers' Association, with an annual output of about 1,000,000,000 feet of lumber (p. 943); Lightner, manager Goodyear Logging Co. (p. 888); Chisholm, manager for Merrill & Ring, largest loggers in the country (p. 871); Ayer, a large lumberman of Portland (p. 2275); Butler, connected with many logging and lumbering interests (p. 1054), and Hawkins, Col. Disque's predecessor. These and other witnesses stated that the loggers and lumbermen of the coast easily could have met all demands if given an opportunity to do so. All they needed was authority to go ahead and the combined energy and capacity of the logging industries would have met every requirement in half the time, and without an army of 30,000 inexperienced men then needed in France.

Disastrous Riving Operations

Immediately after Col. Disque's advent on the coast in October, 1917, he started what was known as "riving" operations, which consisted in cutting down selected spruce trees and then splitting off such portions as were deemed suitable for airplane lumber, leaving the rest in the woods to burn or decay. Such operations included building of camps and roads at large expense, all of which were speedily abandoned when it was learned by experience and from practical lumbermen that the method was wasteful and produced comparatively little timber, while the enormous cost was accompanied by great fire hazard due to the timber destroyed and left to rot. Riving was a short-lived experiment that would never have been undertaken by any experienced lumberman.

(*To be continued*)

NAVAL *and* MILITARY AERONAUTICS

Aerial Ambulance Successful in Trial Flights

The first U. S. D-4 Ambulance Aeroplane has been successfully flown at Dayton, Ohio, by Lieut. Edwin Johnson. It was designed by A. V. Verville, Aeronautical Engineer, Air Service, and developed at McCook Field, Dayton, Ohio. Each machine has accommodations for ambulance pilot and two patients. These patients are laid in Stokes Navy litters which are placed horizontally in fuselage. Provision is also made in the form of an auxiliary semi-cockpit for the transport and accommodations of a medical officer to scene of accident, and also for a first aid kit and medical essentials.

The Landing Gear has been moved 7 inches farther ahead than in ordinary DH-4's, to obviate danger of "nosing over." A reversible pitch propeller is also to be installed to facilitate ease of landing within restricted area apart from suitable flying fields.

Officers Taking Course for Aeronautical Engineers

Eleven commissioned officers are taking the course for Aeronautical Engineers at Kelly Field. Of these men, six come from Kelly Field, one from the Air Service Mechanics School, and four from border stations. The enlisted students number 393.

Balloon Companies to Cooperate with Coast Artillery

The 14th and 24th Balloon Companies which left Fort Omaha, Nebraska, recently are to work in conjunction with the Coast Artillery on the Pacific Coast. The two companies each have a complement of one officer and 120 enlisted men, and will serve as the two ends of an aerial base line for observing Coast Artillery Fire. These experiments will be conducted at San Francisco, Seattle, Washington and Camp Lewis, Washington. The mission of the two companies is to determine by experimental observation, the best location for the two ends of the base line in the named districts.

Parachute Plane Painted White

The Air Service Mechanics School at Kelly Field has fitted up a special D. H. -4 B aeroplane and painted it pure white for parachute jumping. The object in painting the plane white is to prevent interference with jumpers and warn aviators flying around in the air to keep a safe distance from the plane in order to prevent collisions with men who have jumped and are descending from the plane by parachute.

Whenever the white D. H. is in the air all planes either go down or go above it, until the jumper has cleared the plane and has proceeded well on towards the earth.

Decorate Officers at Kelly Field

A presentation of decorations awarded by France to three air service officers stationed at Kelly Field, Texas, now, recently took place. The officers decorated were formed in the center of a hollow square formed by the staff officers of the Southern Department, Kelly Field, Brooks Field, and the Air Service Mechanics School, the First Pursuit Group, the First Air Park Group, and the First Bombardment Group.

Colonel Archie Miller presented the officers to be decorated, Major W. G. Schauffler, Jr., First Wing Operations Officer, Major Reed M. Chambers; Commanding Officer, First Pursuit Group, and First Lieutenant James G. Williamson, Adjutant First Air Park Group, to Colonel J. E. Fechet, Department Air Service Officer, who in turn formally presented the medals and citations.

Major Schauffler and Major Chambers received additional citations for the French Croix de Guerre and the American Distinguished Service Cross, respectively, and Lieutenant Williamson received the medal and citation "Officie de Academic Francaise." The citation makes Lieutenant Williamson a member of the French Acadamy.

After the presentation planes of the First Pursuit and First Bombardment Groups passed over in review.

Lighter-Than-Air Research Station

Fort Omaha, the official lighter-than-air experiment and research station of the Army Air Service, is making preparations to prosecute actively a great volume of development work made imperative by the rapid strides in lighter-than-air craft. This work has been hampered by lack of personnel, caused by conditions attendant to demobilization. Arrangements have been made to secure competent civilian engineering specialists, covering the entire range of work involved, in mechanical, structural and chemical engineering, who will constitute a research and experimental board to invent, design, construct, revise and test all equipment as required for the lighter-than-air branch of the Army Air Service.

Army to Test Metal Planes

The War Department is experimenting with the use of metal in military aeroplanes and one of the metal planes has been delivered at McCook field for test flights.

The machines, four in number, are being built at the plant of the Empire Aircraft Corporation at College Point, which is allied with the Empire Art Metal Co.

The fuselage of the plane, which closely resembles the JN type, is entirely of metal and there is a metal box wing beam as well as metal web. The wings are of ordinary aeroplane fabric.

Study Trajectories of Bombs from Aeroplanes.

Using a method devised by Major F. C. Brown, U. S. A., Aircraft Armament Division, Ordnance Department, a study in bomb trajectories is being conducted at the Aberdeen Proving Ground, Md. Early in 1919 Major Brown made tests in which photographs were taken showing the water-reflected image of the aeroplane containing the camera, and by this means the true vertical was determined. In the summer of 1919 a motion picture camera was mounted in a bombing aeroplane and the films of bombs of various types indicated that this method can obtain very valuable data for the design of accurate bombs and bomb sights. The methods used are now to be applied to tests of gyroscopic stabilizers for bomb sights and cameras. Later the tests are to be applied to the study of stability gyroscopes, altimeters and airspeed indicators.

Left to right: Col. Joseph C. Morrow, U. S. A.; Lt. Col. Jacob W. S. Weresi, A. S. A. Pilot; Judge Kenesaw M. Landis; A. Leo Stevens, Chief Balloon Instructor, U. S. Army, just before their recent free balloon flight from Fort Omaha, Neb.

FOREIGN NEWS

Announce the Olympia Aero Show

It has now been announced that the sixth International Aero Exhibition, to be held under the joint management of the Society of British Aircraft Constructors, Ltd., and the Society of Motor Manufacturers and Traders, Ltd., will be opened at Olympia on July 9 and will close on July 20. Entries will be received until May 3.

It was at one time suggested that the exhibition should be held at Hendon, but this was found to be impracticable, and now, by arrangement with Mr. Handley Page, Cricklewood Aerodrome has been secured for exhibition flights in connection with the show at Olympia.

It is intended that the exhibition shall embrace aircraft of all types, aircraft engines, propellers, models, components, accessories and materials, and plant used in their construction. If space is available there will be a special historical section, in which machines used in famous flights will be shown, together with many specimens of early machines and aeronautical souvenirs and relics. The allotment of space in the aircraft section will be made at the discretion of the committee, consideration being given to the special requirements of each exhibit in matters such as minimum dimensions, head room, and so forth. Applicants will ballot for choice of position in the other sections. It is stated in the regulations that exhibits may be shown in motion generaly operated by electric power. The Air Ministry is arranging to instal wireless telegraphy and telephony equipment for demonstration purposes.

Efforts are being made to make the exhibition truly international in character, and many communications have been received from abroad relating to the exhibition of foreign aeronautical products.

Survey Aerial Routes in India

The work of surveying the main aerial routes in India is being carried out by R. A. F. officers, Flying Officer H. A. L. Pattison taking the route from Delhi to Calcutta, Flying Officer R. D. L. Stedman from Calcutta to Rangoon, Flying Officer Keward from Calcutta to Bombay, Flying Officer E. King from Bombay to Karachi, Observer Officer G. S. L. Hayward Delhi to Karachi. Capt. Gunning, Chief Inspector to the Indian Air Board, is now in Rangoon to advise the local Government as to the Burma terminal aerodrome. Some difficulty is likely to be experienced in connection with the two main terminals at Calcutta and Bombay. At Calcutta there is the maidan at Dum Dum, but the ground now being used at Bombay would be under water and impracticable in the monsoons. The Budget for 1920-21 provides five lakhs for civil aviation in India.

A New Aeroplane Service in Norway

About the middle of May a daily air service wil be opened by a Norwegian aeroplane factory from Toensberg *via* Fredrikstad and Moss to Christiania, and back.

Plan a London-Portuguese Guinea Flight

The Portuguese aviator Capt. Portugal, proposes to fly from London to Portuguese Guinea, a distance of 4,000 km., on an F.3 flying-boat (2-375 Rolls-Royce "Eagle") *via* Brest, Lisbon, Madeira, Canaries, and Cape Verde.

Sous-Lieut. Vasconcelos d'Avila will act as second pilot with M. Emilie de Carvalho as observer.

Aerial Service in the Congo

The organization of aerial transit in the Congo is becoming perfected. The route between Kinshasa-Bolobo was opened in March. The distance of 320 kilometers was covered by seaplanes in 2 hours 40 minutes.

Notice of Civil Flying in Switzerland

The following notice to aviators has been issued:

It is notified for information that the Swiss Government have formulated the following rules, to be observed by all aircraft navigating over Swiss territory.

1. Aircraft are not allowed to fly at a lower height than 1,000 meters (3,281 feet) above the undermentioned towns:

Basle
Berne
Bienne
Geneva
Lausanne
Lucerne
St. Gall
Winterthur
Zurich

2. Aircraft are not to fly at a lower height than 500 meters (1,640 feet) over all other localities.

3. For the present, landing is only permitted in Switzerland at places where the Customs Authorities have a control station in operation. These places are:

(*a*) *For Aeroplanes and Airships.*—Dubendorf, about 5 miles E by N of Zurich and La Blecherette, North of Lausanne.

(*b*) *For Seaplanes and Flying Boats.*—Geneva, Lugano, Ouchy, Romanshorn, Zurich, Zurichhorn.

4. Arrangements are being made for the preparation of several other public landing grounds, where Swiss and foreign aircraft will be able to land after passing through the necessary customs formalities at one of the customs control stations mentioned above.

Mme. Henry Deutsch de la Meurthe

Mme. Henry Deutsch de la Meurthe has just given 100,000 francs to the Faculty of Sciences, to found a Henry Deutsch de la Meurthe bursary. The family have also given 50,000 francs for the benefit of French aviators who have been the victims of accident, or of their families who have suffered through the war. The gift is in honor of the late president of the Aero Club of France.

Handley Page London-Paris and Brussels Aerial Services

On the Handley Page Continental Aerial Services run in conjunction with Cie. Messageries Aeriennes, Paris, between September 2, 1919, and April 10, 1920, inclusive, 1,196 passengers and 63,961 lbs. of freight have been carried over a distance of 87,769 miles.

With eleven passengers (including crew) and nearly seven hundred pounds of freight on board a Handley Page commercial aeroplane, piloted by Lieutenant Halliwell, flew to Paris recently in driving rain, low clouds and high wind.

Including a landing at Lympne in order to pick up a passenger, the flight from London to Paris occupied under four hours. This demonstrated the weather-fighting capabilities of the Handley Page machine, which, despite its heavy load, successfully accomplished its journey under the worst possible weather conditions.

Military Flying School in Argentina

The Military Flying School at El Palomar (Argentina) possesses two monoplanes and seven biplanes. Two Caudron biplanes have also been bought from France and serve as models for machines of a similar type. A Spad has been presented by the "Commission Pro Travesia de los Andres," two Nieuports and another Spad by the French and a one-seater as well as two biplanes by the Italian Government. The works at El Palomar have been extended, so that now repairs of all kinds can be undertaken as well as the construction of new machines.

France Using Many Aircraft in Trade

Paris.—The use of aircraft in France for commercial purposes is increasing rapidly. Several companies have been organized to operate aerial lines.

One company, which operates between Paris and London, Paris, Beauville and Cherbourg, and Paris. Lille and Brussels, shows, in a report just issued, that in less than a year it carried 3,542 passengers, 1,933 bags of mail and tens of thousands newspapers.

Italian Aviators Shot Down

According to a telegram from Bagdad, the two Italian aviators who arrived there on March 7th (Captain Gordesco and Lieutenant Grassi, the latest competitors in the Rome-Tokyo flight) report that two other aviators who left Rome with them were shot down with machine-guns by Arabs outside Aleppo.

The machine was kept by the Arabs, but the aviators, Captain Ranza and Lieutenant Marzari, were allowed to return to Constantinople. One of the aviators shot down was an Italian "ace" who went through the war without receiving any injury.

It will be remembered that Lieutenants Parar and Macintosh also met with hostility from the Arabs when they made a forced landing in the desert.

Experiment with Pilotless Aeroplane

It is understood that the British Government is conducting experiments with a model of a new pilotless aeroplane to be directed by wireless, which has been submitted to the Air Ministry by an inventor.

Ansaldo Aeroplanes To Be Made in Five Factories

The Italian firm S. A. I. Gio Ansaldo & Co. (Cantieri Aeronautica) have acquired lately several of the Italian makes of planes. They have five "Cantieri Aeronautica" in all.

The aeronautical works No. 1 are at Bolzoli Mare, and specialize in the building of seaplanes. The aeronautical works No. 2 are at Bolzanito, and build the S.V.A. aeroplanes, and "Balilla A.1." The aeronautical works No. 3 are the ex-S.I.T. works at Torino, and are building planes of this type, and "Pomilio Planes." In future these two types will be abandoned. The aeronautical works No. 4 are at Cadmian (Spezia), and build the "Ansaldo A.M. Seaplanes." The aeronautical works No. 5 are specially designed for the repairing of planes.

The following are the specifications of the Ansaldo Aeroplanes:

	Total area of planes Sq. meters	Horse-power	Weight Empty Kgr.	Speed Km./h.
S.V.A., one-seater	24.20	200	685	215
S.V.A., two-seater	26.90	200	730	210
A.M., one-seater seaplane	26.90	200	850	200
A.M., two-seater seaplane	26.90	200	875	195
A.1, one-seater	21.20	220	615	225
A.3, two-seater	38.00	300	910	200
A.5, two-seater	30.00	290	820	212
A.5, one-seater	.....	290	785	210
A.30, two-seater	36.60	300	1.100	210

French Civil Air Routes

M. P. E. Flandin, Under Secretary of State for Air, said at a luncheon given to the French Aeronautical Press, that in conjunction with the Minister of War more than 3.500 kilometres of aerial routes had been organized in France and Northern Africa up to the end of 1920.

New French Airships for Training

The Astra-Torres 18, one of the most recent French Airships, is to be used for the training of airship personnel, and also for the discovery of shoals of fish.

The New Handley Page Wing

It is announced by Handley Page, Ltd., that wind tunnel tests carried out at the N.P.L. on the new form of wing developed by this firm confirmed their own tests and the claims made for the invention by the firm.

It is understood that the new wing will enable the surface required by any given aeroplane to be halved. It should be pointed out that the statement is somewhat exaggerated as compared with Mr. Handley Page's own claim, which is that the *lift* of a given wing may be increased from 50 to 60 per cent. The inference is not that a given wing will lift twice as much, but that a given aeroplane will lift twice as many passengers, who are a small proportion of the total weight lifted.

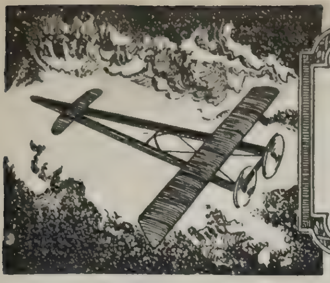
A Bristol Aeroplane for Nicaragua

The Bristol touring biplane, fitted with 250 h.p. Rolls-Royce engines, which was recently exhibited in New York, has been sold to Mr. Joseph F. Thorne, who intends to use it for conveying bullion from his silver mine in Nicaragua to the seaboard. Lieut. Leslie Simmons has been engaged to pilot the machine.

Japanese Make Tokio-Seoul Flight

Three Japanese army aviators on two Sopwith and one Salmson aeroplanes have succeeded in accomplishing a flight from Tokio to Seoul.

The flight was begun on March 8th by five pilots, three on Sopwith machines and two on Salmsons. Two of the machines made forced landings on the way, but without accident to the pilots. The first stage, to Hiroshima, was accomplished during the first day, and a stop was made at Taiku, in Korea, on the second day. Owing to bad weather flying was impossible on March 11th, and the flight was completed on the 12th. A flotilla of destroyers was stationed in the Korea Strait to render assistance in case of emergency



ELEMENTARY AERONAUTICS
and
MODEL NOTES

By John F. McMahon

CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB
921 Ravenna Boulevard, Seattle, Wash.
BAY RIDGE MODEL CLUB
8730 Ridge Boulevard, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE CLUB
Bloomington, Indiana
BROADWAY MODEL AERO CLUB
931 North Broadway, Baltimore, Md.
TRIANGLE MODEL AERO CLUB
Baltimore, Md.

NEBRASKA MODEL AERO CLUB
Lincoln, Nebraska
BUFFALO AERO SCIENCE CLUB
c/o Christian Weyand, 48 Dodge St., Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicago, Ill.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bldg., Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB
455 Murray Ave., Milwaukee, Wis.

CONCORD MODEL AERO CLUB
c/o Edward P. Warner, Concord, Mass.
MODEL AERO CLUB OF OXFORD
Oxford, Pa.
CAPITOL MODEL AERO CLUB
1726 M Street, N. W. Washington, D. C.
AERO SCIENCE CLUB OF AMERICA
Beach Bldg., E. 23rd St., N. Y. City
AERO CLUB OF LANE TECHNICAL HIGH SCHOOL
Sedgwick & Division Streets, Chicago, Ill.

Compressed Air Motors

The compressed air motor is the only one that has proven successful in model aeroplane practice outside of the regular rubber band type of motor. Many steam engines have been tried with little if any success. Prof. Langley built one that really worked and worked well. A few others have been built and have performed well, but about 95 per cent. of all steam engines built have never operated perfectly.

The compressed air motor on the other hand is simpler and of course can be made lighter. Very few if any have failed to function, and owing to the light weight are desirable for model aeroplane work.

There are many types on the market today at little cost, some have been made to sell for $15, others up to $100.

There is some satisfaction in having a compressed air motor in a model, for three reasons. The first is because it is a motor plant and takes the model out of the toy class; secondly, it brings the center of gravity up where it would be in a large machine, and thirdly, it lasts many times longer than a rubber band motor, or it can be transferred from one model to the other.

The Aeronautic Library sends us notice that they are carrying a full line of compressed air motors designed and built by Mr. Beach, an Australian having years of experience, and the writer personally examined the motors and found the workmanship the best, the design simple—which permits light weight—and the motors very efficient. To show how well these motors perform, I reversed the engine by hand and counted forty turns. The motor when released made 37 revolutions in the other direction, showing how well the valves and pistons hold the air.

The motors on exhibition at the Aeronautic Library are 1 large and 1 small three-cylinder rotary, and 1 large two-cylinder opposed. These motors are made in such a way that they can be connected up to a flash boiler and operated with steam pressure.

The address of the Aeronautic Library can be found in their advertisement in this paper.

Illinois Model Aero Club Notes

Mr. B. Pond sends a letter and an article attached to it telling of the wonderful work done by his club the past year, and he has good reason to be proud. It would be well for other model aero clubs to copy the Illinois Model Club's business methods, and if they would I am sure that this country would be envied by every country where models are flown. Mr. Pond goes on to say as follows:

The war is over, the war-time crimp put into the model aeroplane world is fast straightening out. As evidence to this fact let me tell you of a few things which the Illinois Model Aero Club has accomplished in the short space of one year.

A banquet was given last March, a year ago, as a "send-off" and to the success of the contests to come. The summer was marked by a world's record passing from Mr. Pease to Mr. Sweitzer, who made a flight R. O. G. of 4,029 feet. The usual annual series of contests for the handsome Laird Weaver Trophy was won by Mr. Wm. Sweitzer. Mr. R. Jaros won the amateur duration prize. The prize for amateur distance was won by Mr. J. Kroviak. The famed Villard Trophy, much polished and lacquered, is now a permanent part of the I. M. A. C. collection of trophies. The Aerial Age medals were all won by I. M. A. C. members and medals formed an important part of the timekeeping equipment of the lucky ones.

The winter has been marked by some very important events for the club. A scale model contest, aero show exhibit, exhibitions at Marshall Field & Co. on various occasions, a series of contests for 10-inch models, a series of lectures on "Model Designing," and a show of a few of our models before a Pathé cameraman were the winter's most notable activities.

The annual scale model contest was held December 5, 1919. Among the models entered were an "Ansaldo 1" and an S. E. 5 and an Albatross C. V. The model making the best duration flight was given 50 per cent and the other models in proportion. The best workmanship was given 25 per cent and the others in proportion. The model constructed most nearly like the drawing or plan of the original machine, which the contestant was required to furnish, received 25 per cent and the others proportionately. S. E. 5 took first in workmanship and following the original design the Albatross flew longest, but the "Ansaldo 1"—judged a close second in all three characteristics—won a handsomely engraved shield given by Mr. Brock by having the highest average for the three points considered. Had these models been constructed in time, I am sure the Aerial Age Cup for scale models would have had a fine chance of seeing Chicago.

A big boost was given the model game by the Chicago Aero Show, where the models created more of a sensation than the big machines. Members of the I. M. A. C. kept slow flying indoor tractor models circling in the air above the crowds most of the time during the show. The outdoor models and the scale models were hung around above the club's booth and a large case of accessories of all sorts stood across the booth. New members were secured and many orders for models were taken.

A series of indoor contests for 10-inch R. O. C. duration machines with two prizes for each contest was held from January to April. Along with these contests a series of lectures was given on model designing by as many old flyers as could be found. The last talk, which was a very good one, on the "General Design of Flying Models," will be printed in a later issue.

The club gave several exhibitions of flying models at Marshall Field & Co. during the holidays and was rewarded by a fine feed and several new members were attained. The more enthusiastic members of the club waded out to the flying field some time ago to have a Pathé man make some pictures for Reel Twenty-six to be shown all over the country. The pictures were quite good considering the mire under our spirits.

With many of the old members gone the success of the club during a very hard year is nothing short of remarkable. The club remains unchallenged as the foremost model club in the world, and the holder of nine-tenths of all the world's records and another cup.

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Question Column

EDITOR, AERIAL AGE:

Dear Sir—I am in love with a homely girl who works for us, but she don't seem to care for me, while a pretty girl with lots of money wants to marry me. What shall I do?

AVIATOR WILL.

Answer:

AVIATOR WILL.—Marry the one you love, and send me the name and address of the other one.

AERONITIS EDITOR.

Pilot—Where do you bathe?
Observer—In the Spring.
Pilot—I didn't ask you when, I asked you where!

There They Were

An aviator tells this true story of his training in a southern camp during the war: He and a comrade were sent on a rather long trip in a dirigible as a part of their training, and while they were in the air they became confused and lost their way. Accordingly, they descended until they could see a laborer at work just below them. Shutting off the engine, they waited until they were within hailing distance and called out, "I say, where are we?"

"You can't fool me. You're up in that there balloon," was the unexpected reply.

St. Peter:—Confound those people down on earth anyway! Between that fellow Schroeder and those boobs shooting rockets at Mars, we never have any peace.

(*The Naviator*)

Gabriel Correspondence School

LESSON No. 4

If you have had no forced landing since the last issue, your gas must be low and it is time to come down.

There are several well-known methods of landing, but the essential thing in any method is to get down to earth. You may detach a wing and get down quickly, but the chief objection to this is that you may desire to take off again. The detached wing may land in a distant field and it is a cumbersome and awkward thing to carry back.

Some advocate jumping out as a quick method, but this may sting the soles of your feet. A nose dive will eventually bring you to the ground, but if you wear false teeth the sudden stop may cause you to swallow them.

As a rule, the three-point landing is the most recommended. Some dispute has arisen about the three points, but prior to July 1 they were generally accepted as (1) plane whole, (2) pilot whole and (3) nineteenth hole. Some say the three points are safe, sane and satisfactory, and another faction claims that the three points are the two wheels and the tail skid. If the opinion of the latter group is accepted, your plane will settle down with a long, smooth, gliding run. The landing which attracts attention is the one where the plane comes in with the long, graceful bounds of an antelope.

It is preferable to approach your field headed into the wind. Push the stick forward and get a gliding angle that makes the wires whistle the "Marseillaise." Hold her nose down until you can count grass blades, then level off. When you are more experienced, do not level off until you can count the teeth of a cricket as he sits on a blade of grass. You will then land without further effort.

—*Pacific Aeronautics.*

WANTED—Young man would like a nice job testing cushions in aerial limousines. Can fly in any make limousine. Last job was walking for Uncle Sam, but would like change. Address P. O. 234.

Wanted—An Aeroplane

The artillery sergeant was breaking in a new mount, which, to say the least, was nervous. He had done considerable bobbing up and down, but was still holding on.

"I'll get an ambulance," said a private, starting to run.

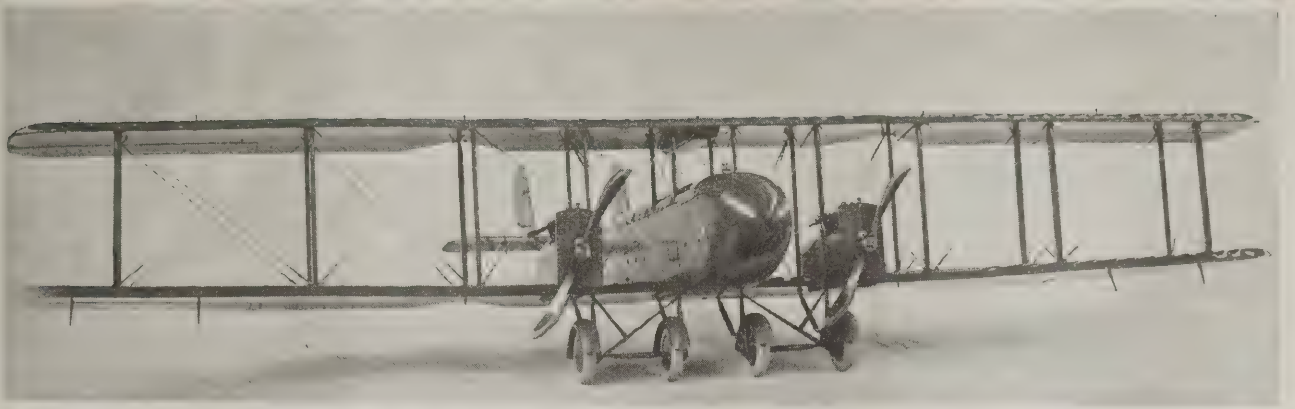
"Never mind the ambulance," yelled the sergeant. "Get an aeroplane."—*American Legion.*

NEXT!—The man who used to spend all his time perfecting perpetual motion has a new diversion; he's trying to cross aeroplanes so they'll lay eggs.—*Buffalo "News."*

Whereupon the Airman Broke an Altitude Record

A New York aviation officer recently visited the little town of Ilion where to get central through a pay station you remove the receiver, but do not drop in a nickel until requested. Accustomed to the New York system of first depositing the money he put in four nickels before he realized his error. Then he got central and explained that he had dropped in twenty cents.

"What's the matter? Are you from the country?" she snapped.



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Forward looking executives are invited to interest themselves in commercial dividends which can be earned by Martin Airplanes.

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MARYLAND PRESSED STEEL CO. (AIRCRAFT DEPT.)
HARRY E. TUDOR, Sales Manager 299 MADISON AVENUE, NEW YORK CITY

(*Continued from page* 289)

the plane by its association with its shadow. The modern schemes of camouflage take all these facts into consideration and measures are taken to eliminate or to lessen the effect of these shadows as much as possible, adding in every case considerably less visibility to the plane.

The sensitive photographic plate was used to detect camouflage in the World War with a great deal of success. Means of overcoming this detection have been studied by every unit of the army interested in camouflage. As the photographic plates recorded different colors only in varying degrees of grays, all that is necessary to eliminate the camera as a camouflage detector is to use such a combination of colors so that equal proportions of the pigments which cause various shades of gray to appear on the plate are embodied in the camouflage. Then no matter what filter is used, the plate will always record the same gray or series of grays as is embodied in the general scheme of camouflage.

The logical conclusions on which to base the design of any camouflage system must be founded on the results obtained from the foregoing statements. With this in view, scale models of various planes were camouflaged and tested over miniature colored maps and flying fields and in contrast with the sky. These models contain on the top an average of six different colors, varying from light tan to dark blue green. As was found by a partial color survey with the eye, the earth colors were brownish yellow for wheat fields, green for grass, purple brown for wet freshly plowed fields, light tan for dry earth and dark bluish green for wooded portions. With these colors placed on the upper surfaces of a plane, in proportion to the area, they appeared on the earth surface, certain of the color patches on the plane were merging with similar color on the earth surface, thus producing low visibility of the plane and also at the same time a distortion of its true shape and size. Further, the proportion of the colors were such that at a blending distance they formed a color corresponding to that of the average earth colors after they were blended so that the plane thus colored remained in a low visibility state at all times. The photograph of the camouflage model as illustrated in Plate 1 shows this principle quite distinctly. The same illustration also shows models done in plain khaki color, black and clear varnished dope surfaces. By holding the illustration a short distance from the eyes the camouflage plane will be seen to completely merge into background while the varnished or white khaki and black, which is distinguished in the photograph by a thin white line on the trailing edge of the upper wing, stands out distinctly with a clear sharp defining silhouette. Sky camouflage for the under surfaces of the wings of course have to be designed to meet the brightness and color of the sky; this was done by the use of pigments of a bright light reflecting power combined with a series of color patches to give a sky color. Plate 2 illustrates this on a model in comparison with no camouflage. Plate 3 shows a model in direct contrast with the sky. Plate 4 illustrates the effect of insignia on the visibility of a plane; in the lower left-hand corner are models of the DH with a new insignia, that of three bands of color, and one of the Spad with two circular insignias. Although both planes are low in visibility, due to their camouflage, it will readily be seen that the Spad with its two "bull's eyes" for insignia will present an enormous target to enemy planes. The psychological effect on the mind of two surfaces of color as represented by the insignia this Spad are to cause the mind to record not to separate spots, but to see only the area between them, thus unconsciously locating the heart of the plane and the pilot. The insignia should have a factor of visibility just above that of the plane in order that the first thing seen would be the mark that indicates the nationality of the machine. As all the allies are using a circular form for marking their planes, it seems much more feasible and logical to change our insignia so that it would be distinct from those of other nations. We are now using in most cases two separate and distinct insignias, one a star in a circle and the other three bars or bands of color as is found on the rudder of our planes. Not only does this tend to confuse the mind, but destroys the low visibility factor of camouflage. The sensible thing to do is to use one standard marking for the entire plane. It should not be the concentric circle form as that is already used by other nations. Three bands of color as used on the rudder is the logical marking for the wings; is distinctive, simple and can very easily be applied in production. Further, one insignia should be used on a wing surface instead of two as at present for the reason stated before.

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AERIAL AGE
WEEKLY

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An Exciting Moment in a Contest at Miami, Florida

President Wilson Will Open Third Pan-American Aeronautic Congress by Radio

BLISHED WEEKLY BY THE AERIAL AGE COMPANY INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
scriptions: Domestic, $4; Foreign, $6. Entered as second-class matter March 25, 1915, at the Post Office at New York under the act of March 3rd, 1879

In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

Aerial Transport Service

which, it is hoped, will eventually serve all of the important cities on the North American Continent.

The plans for this service have been developing for months and will vitally influence Civil, Commercial and Military Aviation throughout the world.

These plans are worthy of the confidence and support of all classes of Citizens, City, County, State and National Officials.

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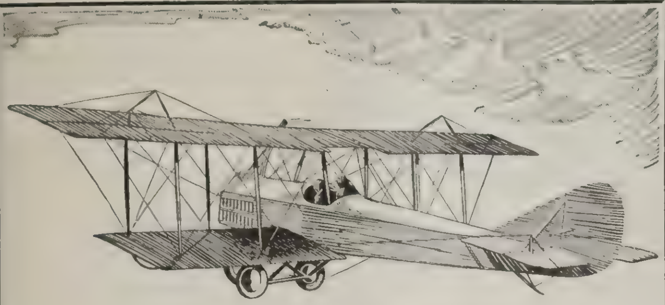

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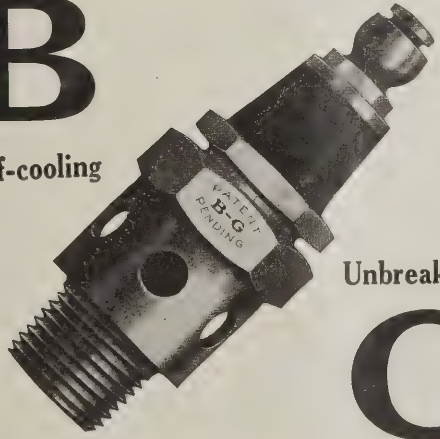

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AERIAL AGE
WEEKLY

VOL. XI. MAY 17, 1920 NO. 10

TABLE OF CONTENTS

PAGE

President Wilson Will Open Third Pan-American Aeronautic Congress By Radio 317

The News of the Week 319

The Aircraft Trade Review 321

U. S. Aerial Mail 322

Claudel Carburetor Now Made in America 323

$1,000 Aviette Challenge Trophy Offered by Aerial League of America to Popularize New Sport 325

New Records and Performances Officially Recognized 326

Book Reviews 326

Monel for Engine Valves 331

Recent Aero Patents 331

Report of Latest Congressional Investigation of Billion Dollar Expenditures 332

Naval and Military Aeronautics ... 333

Foreign News 334

Elementary Aeronautics and Model Notes 335

Aeronitis 336

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VOL. XI NEW YORK, MAY 17, 1920 NO. 10

PRESIDENT WILSON WILL OPEN THIRD PAN-AMERICAN AERONAUTIC CONGRESS BY RADIO—ATLANTIC CITY—MAY 20 TO MAY 30

Official Lunch at Traymore May 20th to Precede Opening — Aerial Safety Challenge Trophy Contest to Start May 22nd—Remarkable Naval Exhibit at Steel Pier — Numerous Surprises to Be Announced at Opening of Congress.

JUST as the Second Pan-American Aeronautic Congress held at Atlantic City last May started the aerial activities which resulted in the purchase of 3,000 aeroplanes for civilian purposes, the Third Pan-American Aeronautic Congress is to start this year's aerial activities and is to start a new epoch, the epoch of aerial transportation. The keynotes of the Congress will be:

(1) Placing aerial navigation on a practical basis as an art.
(2) Establishing organized aerial transportation as a self-supporting business proposition.
(3) Encouraging and developing aeronautic sport nationally and internationally.
(4) Encouraging and popularizing the individual use of aeroplanes by holding organized aerial tours on the principle of the Glidden automobile tours.
(5) Protecting lawful aeronautic activities by the elimination of stunt flying and dangerous operations and by adopting wise legislation and sound conditions for the issuance of insurance policies.

Thirty-two Countries Represented

Thirty-two countries and the aero clubs and all organizations interested in aeronautics and representative industries have been invited to send delegates to this Congress.

Commodore Louis D. Beaumont, member, Board of Governors, Aero Club of America, the Chairman of the Commission organizing the First Aerial Derby Around the World, and Major Charles J. Glidden, the originator of the Glidden Tours and President of the Aerial Touring Association, who started for the trip around the world last October, have personally extended invitations to the authorities, aero clubs and other organizations of all the countries visited.

The Congress is held under the auspices of the Aero Club of America, the Pan-American Aeronautic Federation, the Aerial League of America, the Liga Aerea de Cuba, the Aerial Touring Association and the Aero Club of Atlantic City.

Mr. Alberto Santos-Dumont, who is Vice-President of the Aero Club of America and President of the Pan-American Aeronautic Federation, states that "aerial transportation and aerial sports will knit the states of the Western Hemisphere into an integrally united, co-operating and friendly combination, allied for well-being in sport, trade and commerce, as well as for strength in time of possible war."

As chairman of the Pan-American Aeronautic Committee of the Aero Club of America he has been travelling through South and Central America, creating interest in aeronautics.

Will Open New Epoch in Aerial Sport

This Congress will open a new epoch in aerial sport which has been dormant since the beginning of the war. As there are eighteen international and national contests being organized, with prizes amounting to over $2,000,000, open to American pilots holding the international pilot certificate, and the Aero Club of America alone has issued eight thousand of these pilot certificates, and Great Britain and France and Italy have issued over ten thousand pilot certificates each, the stupendous aerial contests being organized are assured of success. The regulations for the Pan-American Aerial Derby, the Aerial Derby Around the World and the Aerial Circuit of the Atlantic are to be discussed during the Congress at Atlantic City.

Pan-American Countries Placing Large Orders for Aircraft

With the Latin American countries spending millions of dollars in aeronautics, the Pan-American aeronautic movement, which was started in 1912 by Aero Club of America officials, has grown to mean a great deal to the United States, British, French and Italian Aeronautic industries. The orders from Latin American countries received by the Curtiss Aeroplane and Motor Corporation amount to $500,000.

Important Subjects to Be Discussed

Most important subjects are to be discussed at the Congress for the first time and decisions are to be reached which will be beneficial to the development of aeronautics the world over. Some of the subjects to be discussed are:

The rules and regulations for the twenty aerial contests and $2,000,000 in prizes.

Large dirigibles and their value for transportation.

How aerial forest patrol may save $28,000,000 a year by minimizing forest fires.

Work of aerial police squadrons and why every city should have one.

Aerial mail plans for United States, Canada and South and Central America.

Need of municipal landing grounds.

Part played by the aeroplane in city planning.

Value of aircraft for advertising by day and by night.

Pan-American aerial transportation.

Aerial navigation instruments for flying over land and water.

Aerial photography—commercial and artistic.

Aerial exploration and the use of aircraft for coast and geodetic survey.

Need of broader attitude regarding insurance for aircraft and aviators.

Aerial jurisprudence—aerial laws and regulations of air traffic.

Status of aeronautic engineering and problem in construction of large aircraft.

How the weather forecasts can be extended and made more efficient by the use of aircraft in exploring the upper air.

How the weather forecasts help aerial navigation.

Telegraphic and climatic factors in relation to aeronautics.

International medical standards for aviators in war and peace.

Intercollegiate aeronautics and aerial contests.

Official Lunch to Precede Opening of Congress

An official lunch to be held at the Traymore Hotel at 1:30 on May 20 is to precede the opening of the Congress, which is to take place at the Steel Pier at 3:30 sharp, when President Wilson's radio message from the White House will officially open the Congress.

The message will be received by the U. S. naval radio operator at the Steel Pier. Reservations for the lunch can be made up to the morning of May 20 by telephoning to the Hotel Traymore.

Extensive Naval Exhibit

The naval exhibit on the Steel Pier has been prepared by the Board of Survey, Appraisal and Sale and will include one of the F5L type seaplanes equipped with two 400 h.p. Liberty engines. This seaplane has a wing spread of 104 feet, with a total area, including the ailerons, of 1,397 sq. ft., and weighs 8,250 pounds without load, and, loaded, weighs approximately 13,000 pounds, with a speed of 86 miles per hour, but, by decreasing the weight, the speed can be increased to 97 miles per hour.

The board has lately sold a large number of these planes for commercial use, and has only a very few of this type for sale. The plane which will be displayed at the exhibit has been cut away on one side, so as to show the internal construction and the method of bracing the seaplane to make it airworthy and seaworthy.

The exhibit also includes engines of the following types: The Hall-Scott, Curtiss, Liberty, Fiat, and Gnome, together with propellers, radio apparatus, tachometers, and parts of various types of seaplanes. The F5L plane will be completely equipped with radio apparatus and radio telephone in full operation during the exhibition, so that visitors can test out these devices for themselves. All of the ordnance used in this boat, such as machine guns and 3" Davis guns, will be set up.

The naval exhibit occupies an area of 7,500 feet.

Other Exhibits Include British, French and Italian Planes and Aerial Safety Devices

The exhibits, which will be described in the following number of this magazine, will include American, French and Italian planes, and a number of surprises are in store, which will be announced during the Congress.

First Aerial Safety Challenge Trophy Contest to Be Held at Airport May 22

The first contest for the Aerial Safety Challenge Trophy offered for annual competition by the Aerial League of America will be held at the Atlantic City Airport beginning at 3:30 Saturday afternoon, May 22. The public is invited to witness this contest, which will include jumping from aeroplanes with parachute, aerial life preservers and attempting to burn an aeroplane treated with uuburnable "dope".

OFFICIAL REPRESENTATIVES OF COUNTRIES IN CORDIAL RELATIONS WITH THE UNITED STATES WHO ARE HONORARY GUESTS AT THE CONGRESS

France: Hon. J. J. Jusserand, Ambassador E. and P.; Brigadier General Collardet, Military Attache; Captain de Lavergne, Air Attache.

Great Britain: Sir Auckland Geddes, Ambassador E. and P.; Major General H. K. Bethell, Military Attache; Air Commodore L. E. O. Charlton, Air Attache; Captain Geoffrey Blake, Naval Attache.

Italy: Baron Camillo Romano Avezzana, Ambassador E. and P.; Lieut. Col. G. N. A. Guidoni, Air Attache; Major General Emilio Guglielmotti, Military Attache; Captain Pietro Civalleri, Naval Attache.

Brazil: Hon. Augusto Cochrane de Alencar, Ambassador E. and P.; Captain Lieutenant Leopoldo Nobrega Moreira, Naval Attache; Hon. Manoel Coelho Rodrigues; Hon. Theodore Langgard de Menezes, Commercial Secretary.

Spain: Señor Don Juan Riano y Gayangos, Ambassador E. and P.; Colonel Victor P. Vidal, Military Attache.

Russia: Hon. Boris Bakhmeteff, Ambassador E. and P.; Colonel of the General Staff A. Nikolaieff; Captain I. V. Mishtwot, Naval Attache.

Chile: Señor Don Beltran Mathieu, Ambassador E. and P.; Señor Don Gustavo Munizaga Varela, Commercial Counselor.

Argentina: Dr. Tomas A. Le Breton, Ambassador E. and P.; Rear Admiral Julian Irizar, Naval Attache; Colonel Juan Esteban Vaccareza, Military Attache.

Japan: Hon. Kijuro Shidehara, Ambassador E. and P.; Major General Kazatsugu Inouye, I. J. A., Military Attache; Captain Yoshitake Uyeda, I. J. N., Naval Attache; Major T. Hara, I. J. A., Assistant Military Attache; Commander Kiyoshi Hasegawa, I. J. N., Assistant Naval Attache.

Belgium: Baron de Cartier de Marchienne, Ambassador E. and P.; Prince Reginald de Croy, Special Attache.

Peru: Señor Don Frederico Alfonso Pezet, Ambassador E. and P.; General Don Benjamin Puente, Military Attache; Commandante Don Luis Aubry, Naval Attache.

Portugal: Viscount d'Alte, E. E. and M. P.; Commandant Philemon Duarte d'Almeida, Naval Attache.

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China: Hon. Vi Kyuin Wellington Koo, E. E. and M. P.; Captain Teh-Yuen Lu, Naval Attache.

Siam: Hon. Phya Prabha Karavongse, E. E. and M. P.; Hon. Edward H. Loftus.

Cuba: Dr. Carlos Manuel de Cespedees, E. E. and M. P.; Lieut. Jose Van der Gucht, Naval Attache; Hon. Victor Hugo Barranco.

Bulgaria: Hon. Stephan Panaretoff, E. E. and M. P.

Panama: Señor Dr. Don Belisario Porras, E. E. and M. P.; Señor Don J. E. Lefevre.

Ecuador: Señor Dr. Don Rafael H. Elizalde, E. E. and M. P.; Señor Don Miguel A. de Ycaza.

Colombia: Dr. Carlos Adolfo Ureta, E. E. and M. P.; Dr. Alfonso Delgado.

Switzerland: Hon. Marc Peter, E. E. & M. P.; Dr. Conrad Jenny.

Greece: Hon. Georges Roussos, E. E. and M. P.; Hon. Kimon Collas.

Honduras: Señor Don J. Antonio Lopez Gutierrez, E. E. and M. P.; Señor Don R. Camilio Diaz.

Dominican Republic: Señor Dr. Luis Galvan, E. E. and M. P.

Nicaragua: Señor Don Diego Manuel Chamorro, E. E. and M. P.; Señor Don Manuel Zavala.

Montenegro: General Antoine Gvosdenovitch, E. E. and M. P.; Captain Yevrem Chaoulitch.

Paraguay: Hon. Manuel Gondra, E. E. and M. P.

Netherlands: Hon. J. T. Cremer, E. E. and M. P.; Jonkheer Dr. W. H. de Beaufort; Dr. D. H. Andreae.

Serbia: Dr. Slavko Y. Grouitch, E. E. and M. P.; Hon. Branko Lazarevitch; Major Nikola Hristich.

Haiti: Hon. Charles Moravia, E. E. and M. P.; Hon. Albert Blanchet.

Salvador: Señor Don Salvador Sol M., E. E. and M. P.

Persia: Hon. Mirza Abdul Ali Khan, Sadigh-es-Saltaneh, E. E. and M. P.; Hon. Ali Asgar Khan.

Finland: Hon. Armas Herman Saastamoinen, E. E. and M. P.; Judge E. Ilves.

Uruguay: Hon. Dr. Jacob Varela, E. E. and M. P.; Hon. Hugo V. de Pena.

Poland: Prince Casimir Lubomirski, E. E. and M. P.; Hon. Francis Pulaski; Major General Sigismund Brynk, Military and Naval Attache; Hon. Hiplit Gliwic; Captain Ladislas Marszweski.

Roumania: Hon. N. H. Lahovary, Charge d'Affaires ad interim; Major Livius Teiusano, Military Attache.

Czechoslovakia: Hon. Jan Masaryk, Charge d'Affaires ad interim; Colonel Vladimir S. Hurban, Military Attache.

Venezuela: Señor Dr. Don Santos A. Dominici, E. E. and M. P.

(*Continued on page* 338)

THE NEWS OF THE WEEK

Two More Planes Fly from Florida to New York

A Curtiss H-16 flying boat, carrying seven passengers, including the pilot, John M. Miller, arrived at Port Washington, L. I., last week from Palm Beach, Fla. The trip was made in sixteen hours and ten minutes. Several stops were made en route. In addition to the seven passengers 700 pounds of mail was carried.

The flying boat belongs to the America Transoceanic Company and will be kept at Port Washington, to be used to make trips to Connecticut, Philadelphia and other nearby places, to deliver merchandise, carry passengers and do similar work.

Another trip of interest was that of Mr. and Mrs. Robert L. Ireland, who achieved the distinction of being the first long-distance aerial commuters, when they returned to New York by aeroplane from Palm Beach.

They chartered a Curtiss HS-2L flying boat, piloted by Clifford Webster. The trip was made in 18 hours 27 minutes, averaging 75 miles an hour, over a distance of 1,345 miles.

Orenco Four-seater Plane Climbs 16,200 Feet

Mineola, N. Y.—Clarence Coombs, piloting an Orenco plane with three passengers and himself, rose to the height of 16,200 feet, a new world's record, over Mitchell field recently.

The previous record for four passengers was approximately 12,400 feet. While the exact time was not taken, unofficial estimates place it at 1 hour and 10 minutes. The plane has a 150-horsepower motor.

Hunsaker to Deliver Wright Lecture

Commander J. C. Hunsaker, U. S. N., will deliver the Wilbur Wright Lecture before the Royal Aeronautical Society in London on June 22. Prince Albert will preside.

Dirigible Flies at 55 Miles an Hour

The naval dirigible C-10 arrived at the Rockaway Naval Air Station recently after a six-hour flight from Chatham, Mass. The airship encountered strong winds and was in dense fog from Montauk Point, L. I., to Rockaway. While in the fog the airship made fifty-five miles an hour.

The airship was commanded by Lieutenant A. W. Evans and also had on board Lieutenant Charles Bauch, Ensign W. J. Medusky,, Coxswain James F. Shade, Chief Machinist's Mate Fred F. Moorman, First Class Machinist's Mate B. Riley and Chief Operator Charles J. Hulsman. The craft will remain at Rockaway and take part in the maneuvers of the Atlantic Fleet.

Greets Fleet Commander in Message Dropped from Seaplane

A message from the sky was sent to Admiral Henry B. Wilson, commander of the Atlantic Fleet, as the armada steamed up the Hudson River opposite New York City. The message was in the form of greetings by William Fox, President of Fox Film Corporation.

Mr. Fox's letter was dropped upon the deck of the flagship Pennsylvania. It was released for its downward flight by Alfred D. Brick, staff cameraman, who was picturing the arrival of the warships in an Aeromarine seaplane piloted by C. J. Zimmerman. The letter hit the deck squarely, and was picked up by a representative of Fox News, who turned the communication over to the Admiral.

To Hold Air Race Over Washington, D. C.

During the course of the First Annual Army Air Tournament which is to be held at Bolling Field, Anacostia, D. C., on Friday and Saturday, May 14th and 15th, there will be a free for all Air Race to which the public is invited. This race promises to be highly interesting and very thrilling because the competition is open to all Army contestants, and all types of planes can be entered. The course will be from the observation balloon flying over Bolling Field to the dome of the Capitol, thence to the Washington Monument, and then back to the balloon. Twice around the course will constitute the complete race. The contestants will fly at altitudes of 2,000 feet or over. The judge's stand will be on the field directly under the observation balloon, and the end of the race will be sighted off both from the balloon and the judge's stand, similarly to the end of a boat race.

This race will be held on both days and it will be run in two heats. The following entries have been made to date, and many more are expected before the lists are closed:

Lieut. Colonel Hartney, German Fokker; Lieut. Colonel Horace M. Hickam, SE-5; Capt. Steinley, Vought; Lieut. Logan, Sopwith Snipe; Lieut. Haynes, Thomas Morse scout; Lieut. Boggs, Loening monoplane; Lieut. Post, SE-5; Lieut. Dunn, French Nieuport; Lieut. Whitney, Standard scout; Lieut. McGinness, DH-4.

Lieut. Louis Gaubert, one of the most noted French aces, will also take part in the tournament. He will demonstrate the Farman machine.

The Steel Pier where the Third Pan-American Exposition and Convention will be held at Atlantic City May 20-30, taken from the air

Aerial Honeymoon

The personnel of the Aircraft Department of the Maryland Pressed Steel Company's factories at Hagerstown, Md., are experiencing some degree of excitement pending the return of Edward W. Weimer, Jr., superintendent of that department, and his bride, who was Miss Emilie Ward of Greenwich, Conn., from their secret aerial honeymoon tour.

Immediately following the wedding ceremony on Wednesday last, the bridal pair, seated in a Bellanca aeroplane, with the groom at the control, shot into the air amid the ringinig cheers and the good wishes of those assembled on the Bellanca testing field.

In accordance with pre-arranged plans, Mr. Weimar circled over the field and zigzagged several times, finally heading for the Cumberland Valley Mountains and leaving the assembled group in still greater perplexity as to their ultimate aerial route.

Beyond advising their relatives, friends and well-wishers that the next landing in Hagerstown would be in from two to three weeks' time, the selected honeymoon land remains a matter of conjecture.

Farman Tourabout On Aerial Tour

Mr. Louis Gaubert, chief Farman pilot in America, Mrs. Gaubert and their little daughter Gisele, five years old, who already has 10 hrs 50 mins. in the air. This photo shows them at Philadelphia with a Farman "Tourabout" in the course of a successful demonstration tour made in April. Mr. Gaubert, who has flown continuously since 1908, now has 7,965 hours flying time to his credit. Previous to the War, his prizes gained in Aviation contests amounted to over 500,000 francs. To him belongs the honor of bringing down in 1914, with a rifle, the second boche of the War. Also, with Pegoud, who served in the same esquadrille, he performed one of the first "special missions" of the War. Mr. Gaubert was thirty-five years of age when the War broke out but arrived at the front with his plane the first day of hostilities and "did" 500 hours over the lines before he was assigned to work as a tester. He holds the French record for number of planes tested as well as hours in the air.

Mrs. Gaubert is an enthusiastic aeronautiste as well as little Gisele whose ambition is to beat the record of Miss Andre Farman, who at the age of 14 has obtained her pilot's license. Before coming to America, Mr. Gaubert was director of the Farman aerodrome at Bue and will assist M. Wallace Kellett, the Farman representative here, in the same capacity.

Progressive Attitude Shown Toward Aeronautics

Madrid:—Spain, displaying a real progressive attitude for the aeronautic industry, is the first country to recognize the practicability of the aeroplane. A royal decree was recently published in the Official Gazette permitting insurance companies to accept ordinary risks for aeroplane passengers, except when they are participating in trials, races or exhibitions. Machines must be under the charge of a fully certified pilot.

Fast Flight from Daytona, Fla., to Savannah, Ga.

Aviator C. B. D. Collyer, with his mechanic I. C. Underhill, on a flight in his Curtiss JN-4, from Daytona, Florida, to Danville, Va., reached Savannah, Georgia, in two hours and fifty-five minutes from Daytona.

Pilot Colyer is now with the Danville Aircraft Corporation, with whom he will feature parachute jumping and changing of aeroplanes in the air this season.

It is understood that the former Liberty Flyers are joining this company.

Sir Thomas Lipton Will See Cup Races from Seaplane

When the America's Cup races are held this summer Sir Thomas Lipton will probably view them from a Curtiss Seagull flying boat which the Curtiss Aeroplane & Motor Corporation several months ago invited him to use. He cabled his acceptance recently to W. D. Richardson, publicity agent of the corporation.

Oriole Flies from San Francisco to Spokane

Spokane, Wash.—San Francisco to Spokane in 13 hours and 45 minutes of flying time is the record made by D. Davison, pilot for the Earl P. Cooper Company of San Francisco. Davison flew a new 150-horsepower Curtiss Oriole purchased in San Francisco by a Spokane business man. Norman Warsinski of Spokane, made the trip from San Francisco. The distance is 1150 miles, according to government estimates.

Camera to Test Sky Light

Baltimore.—Apparatus from Johns Hopkins University is mentioned prominently in connection with accounts of Professor David Todd's proposed approach to Mars from Omaha for conversational purposes. It was stated by Professor Robert W. Wood, of Johns Hopkins, that this apparatus is probably the gun camera which he has invented for the purpose of determining why the sky is blue.

It is proposed to send the gun camera out to Dayton, Ohio, within the next few weeks for a special test of the sky.

Pictures will be taken of the intensity of the sky light, measurements of which are needed to disprove theories advanced by some so-called scientists who maintain that the sky is black.

Personal Par

W. T. Barnard has been elected president of the Spokane Flyers club. He succeeds Thomas Symons. Floyd McCrockey was elected vice president, and Joseph Albi, secretary.

Domenjoz Giving Exhibitions with Monoplane

Jean Domenjoz, the Swiss-French pilot, who has flown the Bleriot monoplane for ten years, is returning to Sheepshead Bay, New York, to give exhibitions. He is the only exhibition flyer only using a monoplane in this country.

John C. Jackel, his representative, plans to give him extensive exploitation and a long list of fair bookings for the coming season. Domenjoz is well known in the East as an exhibition aviator, having appeared in the past at the Quebec Exposition, Rochester Fair and other fairs and exhibitions of note.

Philadelphia Aero-Service Corporation Makes Record Training Students

The Philadelphia Aero-Service Corporation have been making some records in training flyers this Spring. Ten students have already qualified for their pilot's license this season and so far the honors of the school are with Ralph F. Thomas of Lewiston, Pa., who took his first solo flight on the morning of May 3rd after one hundred and sixty minutes' training. He completed his tests for the F. A. I. Pilots' License the same afternoon. Mr. Thomas had only been at the Philadelphia school ten days before he qualified. He had no previous flying experience and it is believed this is the record time for a student to qualify under the new tests required by the International Licensing bodies. Mr. Thomas is now taking an advanced flying course at the school.

The Philadelphia Aero-Service Corporation makes a feature of not requiring a bond for the use of the plane for solo flights by their students. When their instructors are satisfied that a student can fly, they assume all risk of breakage.

D. B. Bartholomew, another graduate student, has purchased a three-seater plane from the school and has flown to his home at Waterloo, Indiana. Before leaving Mr. Bartholomew broke the altitude record of the field, making a height of 10,500 feet in a Canadian Curtiss on May 5th.

Mr. and Mrs. Louis Gaubert and their little daughter Gisele, with the Farman "Tourabout," in which they are making a demonstration tour. Mr. Gaubert, who is a veteran French pilot, is the chief Farman pilot in America

The AIRCRAFT TRADE REVIEW

Kiln-Drying Course at Forest Products Laboratory

The problem of an adequate supply of properly seasoned stock is to a large extent a kiln-drying problem. Satisfactory methods of kiln drying hardwoods as well as softwoods green from the saw have been developed at the Forest Products Laboratory and demonstrated to representatives of commercial firms in practical kiln-drying courses.

The kiln-drying course has proved so satisfactory that, as long as there is sufficient demand by manufacturers and others interested in kiln drying, the course will be given monthly starting in July, 1920.

The course consists of ten full days instruction in kiln drying under a staff of competent specialists, and is of particular value to superintendents, lumber and production men, and kiln foremen of wood-using industries.

The Forest Products Laboratory is a government institution of industrial research conducted by the United States Forest Service at Madison, Wisconsin. The aim of the laboratory is to promote economy and efficiency in the utilization of wood and in the processes by which forest materials are converted into commercial products. The personnel consists of over 200 engineers, chemists, specialists, and assistants.

Government Seeks Buyer for Aerodrome

London.—The American aerodrome at Eastleigh, near Southampton, Hants, is for sale. The area is over 250 acres, and there are several large buildings ready for use, as well as stores and railroad facilities.

Bristol Pullman Well Adapted for Aerial Travel

The Bristol and Colonial Aeroplane Company of England has recently completed an immense passenger or freight-carrying triplane of more than ordinary merit, capable of carrying great weight on long distances without danger of forced landings.

In addition to the pilot and engineer this giant aeroplane has accommodation for 14 passengers. A special Pullman car has been designed in which luxuriously upholstered arm chairs are provided for each passenger and also an electric grill for cooking and a completely equipped washroom. The seats are so arranged that they may be removed to provide space for the storage of baggage or general cargo, and as much as 320 cubic feet can be made available. In addition to the two pilots the Bristol Pullman is capable of lifting 2,700 pounds with fuel for 5 hours' flight, or alternately 4,000 pounds with fuel for 2½ hours. The plane when fully loaded will average 105 miles per hour on three-fourths throttle or 135 miles per hour maximum full throttle. The Bristol is equipped with four American Liberty motors with 400 horse power each, arranged in tandem. The machine will fly on any two motors so that the danger of making a forced landing through engine failure is eleminated. This machine could be turned into a dangerous bomber within twenty-four hours by merely stripping down some of its excess weight, adding a ten-hour fuel supply and increasing its bomb-carrying space.

Western Syndicate Plans Aerial Service

Cincinnati.—The Western Air Line Syndicate has been organized in Cincinnati for the purpose of placing aeroplane transportation lines in operation between the cities of the Middle West.

Contracts for carrying the United States mails will be sought by the company. Fred M. Renshaw, traffic department of the Chamber of Commerce, is working with the Chamber of Commerce in other Middle West cities to ascertain from manufacturers just what tonnage is available for these lines.

The members of the company include officials of the Cincinnati Aircraft Co., members of the Chamber of Commerce of Cincinnati, and the following out-of-town men: O. C. Johns, Erie; F. C. Wells, Chicago; W. A. Hubbard, Louisville; Frank Bernstein, Indianapolis; C. C. Berry, St. Louis, and G. F. Thomas, Cleveland.

Logan Aviation Co. Opens Flying Field

The Floyd J. Logan Aviation Co., Curtiss aeroplane and flying boat distributors in Ohio, who will open their flying field on Linndale Road, May 10, have just closed connections with P. C. (Zip) Latham.

Latham will do spectacular exhibition work by climbing over the planes in mid-air.

The Logan company will also be ready to handle aerial photography, advertising programs, delivery campaigns, exhibition work and the flying school will open at the same time.

They expect to provide another feature; that is, to have a plane ready to leave at any hour of the day for any distant point. The opportunity to be transported by air quickly and safely to Pittsburgh, Columbus, Indianapolis, etc., will contribute to putting Cleveland on the aerial map.

Panhandle Company Reorganizes

The Panhandle Aerial Service and Transportation Co., of Amarillo, Texas, has been reorganized, and Mr. William S. Ferdon of Sheridan, Wyoming, is now manager of the company, succeeding W. K. Whipple who has resigned.

The company is operating a passenger-carrying service, school of instruction, and a photo news service, and flying fields are to be established in various parts of the southwest. A branch office is now open at New Orleans, La.

The Panhandle company will issue aerial weather reports to all aviators passing through their teritory, from the main office at Amarillo.

The new manager Mr. Ferdon, is an old pilot in the aviation business, and during the war served as an instructor.

Establish Aerial Service at Spokane

Spokane, Wash.—A regular aerial passenger carrying route between Spokane and Walla Walla, Wash. has been established by the Symons-Russell Aviation company of Spokane. It is the first route of the kind in the state, and is being successfully operated. A trip is made each Wednesday, as traffic is not heavy enough to warrant daily trips. A Curtiss Oriole is used.

The distance is 130 miles by air each way, and the trip is made in one hour and 20 minutes. The return is made the same day. The best train time between the two points is 7 hours and 50 minutes. The fare is $65 per passenger each way.

Complete Plans for Wright Aeronautical Corp. Building

The Wright Aeronautical Corporation of America, 40 Wall Street, New York, has completed plans for its proposed two-story reinforced concrete plant, 45 x 200 feet, on Meeker Avenue, Newark, N. J., to cost about $350,000. John W. Ingle, 527 Fifth Avenue, New York, is the architect.

Farman Goliath used in the Paris-London passenger service. On the left of the picture is M. Flandin, French Minister of Aviation

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, Assistant to the Second Assistant Postmaster General in Charge of Aeronautics
S. Murray Moore, Jr., Chief of Maintenance and Equipment

J. Clark Edgerton, Chief of Flying
John A. Jordan, Chief of Construction
George L. Conner, Chief Clerk, Aerial Mail Service
John A. Willoughby, Operator in Charge Radio Experiments
Eugene Sibley, Operator in Charge Radio Maintenance and Operation

Eugene J. Scanlon, Chief of Supplies

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Paul S. Oakes
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt

Charles I. Stanton, Superintendent New York-Washington Division
Walter H. Riddell, Superintendent, New York-Chicago Division
William J. McCandless, Superintendent, Chicago-Omaha Division
Samuel F. Doane, Manager, Heller Field, Newark, N. J.
William H. Read, Manager, Bustleton, Pa.
Duard B. Colyer, Manager, College Park, Md.
Andrew R. Dunphy, Manager, Chicago, Ill.
Maurice J. Kelly, Manager, Bellefonte, Pa.
William I. Votaw, Manager, Omaha, Nebraska
Victor W. Fitch, Manager, Newark Warehouse

PILOTS

Frederick A. Robinson
Walter J. Smith
Paul W. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris
Mark C. Hogue
Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen

To Guide Aerial Mail Pilots With Searchlights

New York.—Pillars of light, 10,000 feet high, will guide the aerial mail planes across the flat lands between Chicago and the Rockies, when the New York-San Francisco route is instituted next summer.

They will form an integral part of the first attempt at consistent night flying in times of peace. The initial beacon has been purchased and will have a trial at Washington within a few days. It then will be set up in the New Jersey hills, at the junction of the Cleveland and Washington air mail planes, to guide flyers who are delayed till dusk or have to start before daylight.

The apparatus of these lighthouses of the air stands only about four feet high, but sends a shaft of light 10,000 feet into the sky. A system of alternating flashes, similar to that of light-houses along the coast, will be instituted. At the bases of the beacons, emergency landing places will be marked out, so that a flier in trouble will recognize the lights not only as guides, but as safe havens. The light is furnished by acetylene gas.

Farman Planes Carry Mail During French Rail Strike

During the recent railroad strike in France, the Farman Company was charged with assuring the delivery of letters, packages, and passengers by aeroplane on two lines, Paris-Bordeaux and Paris-Marseille.

The large Farman Goliath machines were put on the service from Paris-Marseille and Bossoutrot made the first trip with the latest model Goliath carrying passengers and 1200 lbs. of letters destined for Dijon, Lyon, and Marseille. The service ran perfectly with landings at Dijon and Lyon for the distribution of letters.

On the line Paris-Bordeaux, Farman Tourabout models were used, making one stop at Tours and carrying 440 lbs. of letters per trip.

On the Marseille line the Goliath made a record voyage from Dijon to Lyon (118 miles) in one hour and three minutes or at a rate of almost 115 miles per hour.

UNITED STATES POST OFFICE DEPARTMENT

NEW YORK-WASHINGTON ROUTE—AIR MAIL SERVICE

Monthly Report of Operation and Maintenance, March, 1920

Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	SERVICE AND UNIT COST						
													Gallon of Gasoline	Total Time Run hr.	min.	Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mil
12	$6.72	....	$76.24	$40.24	$20.75	$36.56	$15.88	$36.50	$4.20	$46.24	$65.97	$349.30	24	2	15	175	7.3	$155.22	$2.00
30	....	....	76.24	40.24	20.75	36.56	....	30.78	....	72.50	65.97	343.04	......	....	....	......	......	......	....
31	244.58	$29.43	76.24	40.24	20.75	36.56	195.22	211.99	9.30	72.50	65.97	1,002.78	826	27	40	2,085	2.5	36.24	.48
33	71.46	11.62	76.25	40.24	20.75	36.56	30.93	254.98	1.75	72 50	65.97	683.01	247	4	23	322	1.3	155.82	2.12
34	233.64	45.86	76.25	40.24	20.75	36.57	211.92	210.53	28.45	72.50	65 97	1,042.68	833	30	02	2,340	2.8	34.74	.45
35	....	....	76.25	40.24	20.75	36.57	....	79.08	....	72.50	65.97	391.36	......	....	....	......	......	......	....
42	....	....	76.25	40.24	20.75	36.57	....	164.79	61.01	72.50	65.97	538.08	......	....	....	......	......	......	....
43	194.78	31.65	76.25	40.24	20.75	36.57	149.59	186 16	10.30	64.90	65.97	877.16	691	21	07	1,697	2.5	41.52	.52
46	63.48	10.93	76.25	40.24	20.75	36.57	81 50	207.88	25.70	72.50	65 97	701.77	289	11	33	975	3.4	60.78	.72
48	87 14	23.29	76.25	40 24	20.76	36.57	45.86	141 75	2.65	44.30	65.97	584.78	308	6	30	625	2.0	89.94	.94
49	154.56	25.84	76.25	40 24	20.76	36.57	125.13	184.70	3.25	72.50	65.97	805.77	552	17	44	1,570	2.8	45.44	.51
51	120.82	16.54	76.25	40.24	20.76	36.57	83.26	107.05	35.60	72.50	65.97	675.56	429	11	48	975	2.3	57.24	.69
110	68.32	18.84	76.25	40.24	20.76	36.57	89.38	110.95	65.70	50.00	65.97	642.97	244	12	40	1,255	5.1	50.76	.51
111	70.60	4.98	76.25	40.25	20.76	36.57	21.05	142.85	2.00	100.00	65.97	581.28	245	2	59	253	1.0	194.82	2.30
24227	20.96	4.92	76.25	40.25	20.76	36.57	12.23	39.45	693.45	50.00	65.97	1,060.81	72	1	44	128	1.8	612.00	8.29
44301	52.92	8.52	76.25	40.25	20.76	36.57	142.88	75.83	79.15	35.00	65.97	634.10	189	20	15	1,290	6.8	31.32	.49
44305	10.66	.75	76.25	40.25	20.76	36.57	63.50	10.15	3.00	31.15	65.97	359.01	37	9	00	500	13.5	39.90	.72
Total	$1,400.64	$233.17	$1,296.22	$684.12	$352.83	$621.65	$1,268.33	$2,195.42	$1,025.51	$1,074.09	$1,121.49*	$11,273.47	4,986	179	40	14,190	2.8	$62.76	$0.79

Cost per mile, overhead, $.20; cost per mile, flying, $.32; cost per mile, maintenance, $.27.

Note: Plane No. 12, Curtiss JN4H, equipped with Hispano-Suiza 8 motor.
Planes Nos. 30 to 51, inclusive, Curtiss R4, equipped with Liberty 12 motors.
Planes Nos. 110 and 24227, De Havilands, equipped with Liberty 12 motors.
Plane No. 111, Twin De Haviland, equipped with two Liberty 6 motors.
Planes Nos. 44301 and 44305, Curtiss JN4D, equipped with Curtiss OX5 motors.

*Includes $126.23 covering work preliminary to the inauguration of service between Chicago and Omaha.

OTTO PRAEGER, Second Assistant Postmaster General.

CLAUDEL CARBURETOR NOW MADE IN AMERICA

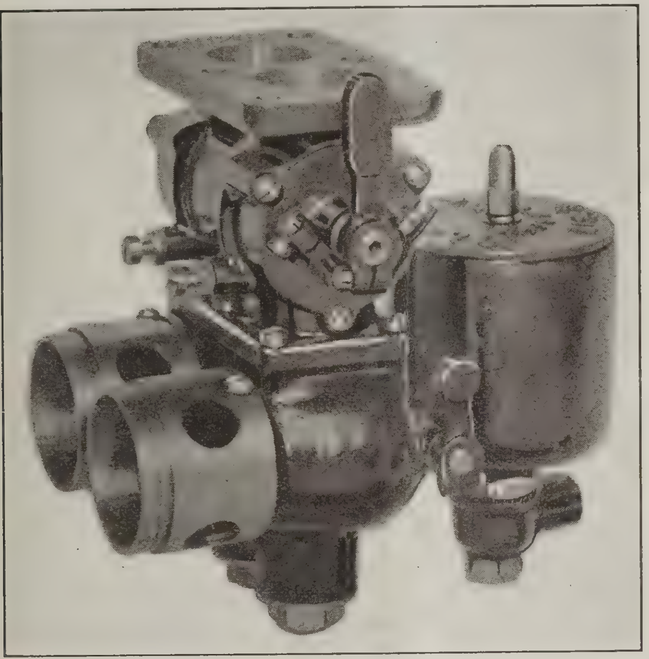
Plain-Tube Instrument Embodies Highly Scientific Principle of Diffusor With Compensating Air Jets

THE Claudel carburetor, widely used in Europe for twenty years, is now made in America by the Claudel Carburetor Company, Long Island City, New York. This highly perfected, plain-tube mixing device was designed by Charles Henri Claudel, the pioneer in the development of the plain-tube type of carburetor, who is recognized as the foremost European authority on carburetion.

Records made by the Claudel carburetor in European racing before the war were both numerous and comprehensive, ninety-three first prizes being captured in 1913, in addition to the Indianapolis race and the breaking of all world's records on the Brooklands track in England. As a result, Claudel carburetors were employed extensively on the foremost Allied aviation engines from the beginning of the war in 1914 until the end. Among these were the Rolls-Royce, Sunbeam, Peugeot, Salmson, Hispano-Suiza and Renault.

Used on R-34

Claudel carburetors made the first round trip across the Atlantic from England to America on the Sunbeam engines of the British dirigible R-34. They were also used on the Rolls-Royce engines of the Vickers-Vimy aeroplane, which was the first plane to make a non-stop flight across the Atlantic. The fact that this craft completed its long flight with one-third of its fuel unused is a striking commentary on the fuel-saving ability of the Claudel.



The standard aeroplane duplex Claudel carburetor

Another record held by the Claudel carburetor is that for power and speed established by Sadi Lecointe, the famous French aviator, who set a new world's speed record of 232 miles per hour.

Americanized in Design

The engineers of the Claudel Carburetor Company have Americanized the European model of the Claudel to meet the particular requirements of engineering needs in this country. They have added several features demanded by the American motorist, such as a quick-starting device and rapid acceleration with a cold engine.

The Claudel Carburetor

Early carbureting devices employed a spring-controlled air valve in an effort to secure the proper mixture balance throughout a wide range of engine speeds. In 1903 Charles Henri Claudel, of Paris, France, patented the first plain-tube automatic compensating carburetor without the use of moving parts. His early principle of breaking up the gasoline by a swift current of air, making an emulsion inside the jet itself before delivery to the carburetor proper, was original with him and has since been widely copied. The modern Claudel retains the same principle, refined and improved to vaporize the heavy fuel of today.

The Claudel Principle

The automatic functioning of the Claudel carburetor is based upon the action of the diffusor jet assembly. This device combines three distinct principles of operation:

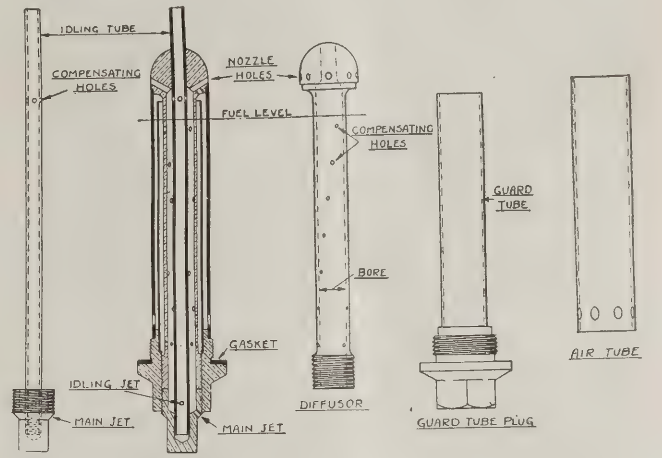


Fig. 1. Diffusor of the Claudel carburetor in section, and its components

First—The orifice or jet which supplies all of the liquid fuel is placed at charge, or below the fuel level, where its flow is proportional to the difference in head.

Second—The diffusor proper is in "shunt" position, that is, enclosed in a chamber with openings at one end to the atmosphere and at the other end to the suction in the carburetor, thereby reducing the effect of the suction on the fuel flow.

Third—Through the nozzle holes in the diffusor head the interior emulsion chamber of the diffusor is placed under the direct action of the vacuum in the carburetor, increasing the discharge as the vacuum is increased.

The combination of these three principles of operation, cor-

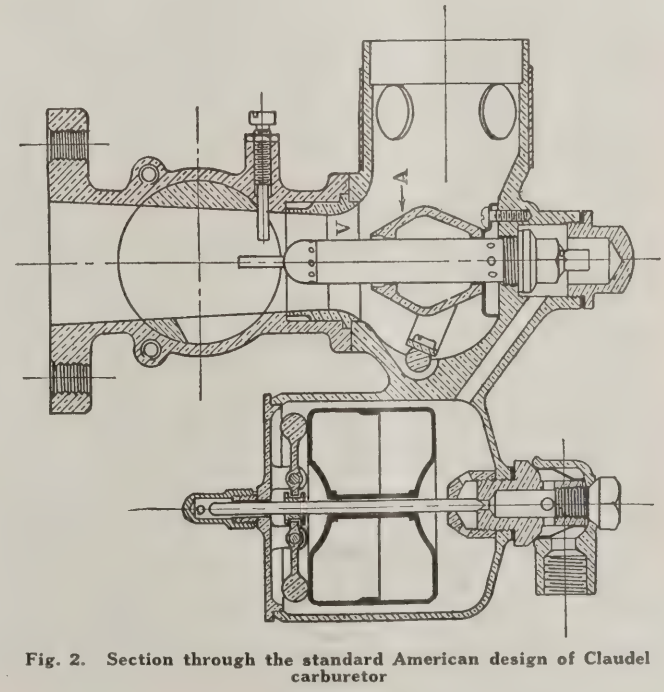


Fig. 2. Section through the standard American design of Claudel carburetor

rectly applied, gives a balanced mixture exactly proportioned for the best results at every engine speed and load.

The Claudel is really a combination of two types of jet, one, the main jet, Fig. 1, of constant flow per unit of time; the other, shown as a series of nozzle holes, of suction-controlled flow. Fig. 1 indicates the fuel level when the carburetor is at rest. Fuel from the float chamber flows through the main jet into the diffusor, then through the compensating holes into the reservoir or diffusor bore. It also flows through the idling jet into the idling tube, the level in the three tubes being the same as that in the float chamber.

The Diffusor

Air at atmospheric pressure enters the outside base or air tube of the diffusor column, passes up this outer sleeve and over the top of the gasoline guard tube, which prevents the fuel from overflowing. As the throttle is opened gradually and the suction in the diffusor increases, thereby lowering the liquid level in the diffusor bore, a series of air bleed or compensating holes are progressively uncovered. Through these holes the air rushes into the ascending column of gas vapor and out the nozzle holes at the top of the diffusor in a finely broken-up gasoline emulsion. The higher the suction acting upon the diffusor, the lower will be the level of gasoline within it, and therefore, more of the compensating holes will be uncovered, permitting a greater dilution of the mixture.

At the higher speeds the diffusor is practically emptied and twenty-one spirally-arranged air bleed holes are in action. As the gasoline globules are lifted by the suction, they must pass through a barrage of twenty-one air guns shooting at right angles into the ascending fuel. This turbulent mixing effect produces a finely divided fuel emulsion ideal for rapid flame propagation, extreme economy and high power. The diffusor discharge is in approximately the ratio of fifteen parts of air to one part of gasoline by volume. This thorough intermixture of air and gasoline before it enters the carburetor barrel is the Claudel method of breaking up the heavy fuel of today for extreme economy.

It will be easily seen that any kind of a power or consumption curve desired can be secured by changing the size and position of the compensating holes in the diffusor wall. For example, if the consumption curve shows a rich spot at an engine speed of 1,000 r.p.m., the holes at this level of the gasoline in the diffusor could be enlarged, thinning out the mixture and bringing it to the point desired. In this way an exact gasoline and air ratio can be maintained for the best results.

The clean, streamline interior of the Claudel plain-tube carburetor, with the barrel throttle giving an extended venturi effect, leaves no obstruction in the path of the charge and consequently full volumetric efficiency is assured. Also the gradual taper of the interior walls holds the mixture in uniform suspension and velocity.

The Idling Device

The idling device is incorporated in a central tube projecting up into the depression of the barrel throttle where a strong pull is exerted on the idling jet for low-speed action. The barrel throttle is slotted to pass around the idling jet and the only adjustment on the carburetor is a screw extending into the air space to partially block off the area of this slot as desired. Screwing it in lessens the air area and enriches the idling mixture. Screwing it out makes the mixture leaner.

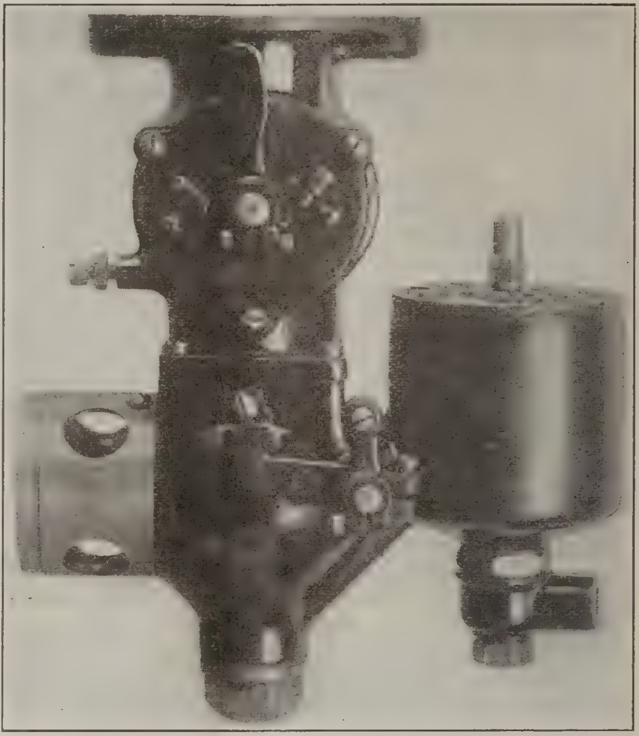


Fig. 3. The American Claudel carburetor is a highly finished instrument. It is universal as to position and control levers

Easy Starting Feature

In the American type of Claudel shown in Fig. 2, a decided improvement has been incorporated for strangling the air by means of a sliding air cone, controlled from the dash. This device assures quick starting and warming up in cold weather, and *absolutely disregards temperature.* The streamline air cone, concentric with the diffusor, may be raised into contact with the venturi, shutting off the air supply and putting the full suction on the diffusor. In this position it is only necessary for the cylinders to exhaust the air in the top of the carburetor before the diffusor discharge must commence. This action is instantaneous, as the volume is small.

Referring again to Fig. 2, the sliding cone A, in its closed or strangling position, fits snugly into the venturi entry V. The streamline shape of the cone centers and steadies the air stream so that it passes the nozzle holes of the diffusor with high velocity and in an even column ideal for the best results. In its lowest position the cone offers no restriction to the

(*Continued on page* 339)

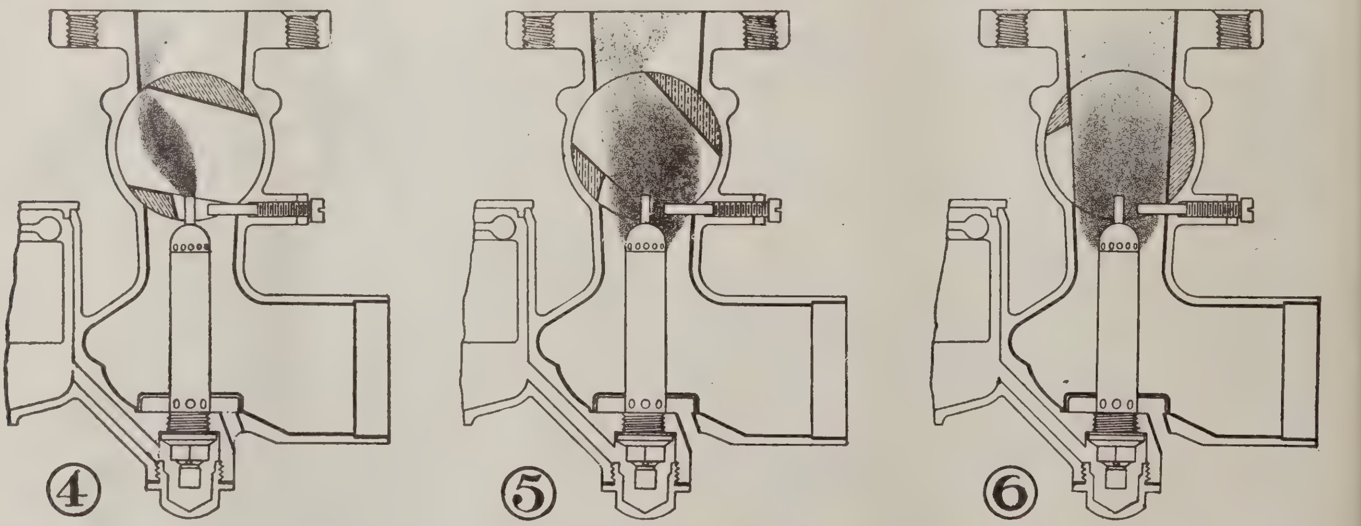


Fig. 4. Diagram of mixture flow with barrel throttle in idling position; Fig. 5, at half throttle diffusor jets come into action; Fig. 6, the diffusor jets in full capacity operation

$1,000 "AVIETTE" CHALLENGE TROPHY OFFERED BY AERIAL LEAGUE OF AMERICA TO POPULARIZE NEW SPORT

TO popularize the new sport of "Avietting" or flying bicycles and motor bicycles equipped with wings, the Aerial League of America announced the offer of a $1,000 "Aviette Challenge Trophy" to be competed for annually, the first contest to be held as soon as it can be arranged.

"Avietting" has just recently been accepted as a recognized aeronautic sport by the International Aeronautic Federation, the body which controls all aeronautic sports, and the Aero Club of America, as the representative of the Federation in the United States, will homologate the records made either by bicycles or motorcycles with wings.

The flights made by winged bicycles up to date have been only a few inches high and a few feet in distance; making the aviette leave the ground speed attained by pedaling is as huge a task as it used to be to the early aeroplanes to leave the ground. Subtle problems of aeronautic engineering must be solved before long flights can be made. But by building the bicycle as light as possible and equipping it with a set of efficient wings, short flights are possible. It is not possible at present to operate a propeller fast enough by pedaling to push or pull the aviette forward.

Motorcycles with wings, on the other hand, can be equipped with propellers and fairly long flights are possible.

The scientific aspects of the problem of building efficient aviettes are important and the practical value of experiments will be the possibility of developing inexpensive, low powered flying machines.

The first to succeed in leaving the ground with a winged bicycle was the French middle distance bicycle racer Lavelada, she managed to skim the air for a distance of 44 inches at a height of 8 inches at a trial made in 1913 near Paris.

The movement was given impetus before the war by the offers of big prize money, and many well-known inventors were added to the list of competitors. In February, 1912, the Peugeot Motor Company of Paris offered a prize of 10,000 francs to the first to make the flight of 32 feet entirely by muscular energy. Soon afterward the French publication, *La Justice*, offered 100,000 francs to the first man to make the flight from Paris to Versailles and return without a stop. The entries for the Peugeot prize came fairly fast. On the very first day there were a dozen, and they kept increasing until in May they reached the number of 198.

All the entrants had bicycles, some large, some small, some biplanes, some monoplanes, some with propellers, some without, they were all enthusiastic and believed they could do it. As the time of the race neared it became evident, however, that it would not be so easy, private experiments proved that it was quite hard and even professional cyclists found it difficult to make jumps with their machines.

Then the Peugeot company offered a preliminary prize of 1,000 francs for a very short flight of forty inches distance at a minimum height of four inches for propellerless aviettes. This contest took place on June 2, at Issy-les-Moulineaux, when the entrants numbered 23.

They all raced along the aerodrome on their winged bicycles and tried hard, but none left the ground for even a fraction of a second. The contest was not without its amusing features for the spectators, as there were many tumbles and crippled wings, as the contestants attempted to hurdle the string in front of the grand stand. They would speed along for half a mile and they would find their wings inadequate to soar even four inches above mother earth.

Friends would rush to their rescue and help to clear the track for the next one, whose efforts met with the same failure. But this failure is considered by no means final; it is supposed to be due to the little study given the matter, to the fact that most people thought it easy and did not make proper study of the problems.

Then on October 13, 1912, the bicycle racer Rettich, at Park au Prince, Paris, succeeded in leaving the ground with a monoplane aviette.

This new science was met with enthusiasm all over France, gaining impetus since the war, and through the recognition of the sport of avietting by the International Aeronautic Federation.

Its ranks all recruited by serious men, many professional bicyclists, aviators and sportsmen and also women. If nothing else, avietting promises to become a popular sport. There is already an organization with over 200 members, all of whom possess aviettes, and branches are being launched all over France.

Henry Woodhouse, vice-president of the Aerial League of America, is one of those who believe the aviette is an important dvelopment.

"Avietting is more than mere acrobatic practice," said Mr. Woodhouse. "It is an incipient science. The principles involved are subtles and some day may, by further development and combination with motorless gliding, develop into an art.

"That is why so many serious-minded people are experimenting in that line and why such aviation experts as Gabriel Voisin, Jean Goupy, Count Gustave de Puiseux, Emile Ladougne and other French veterans of aviation gave the matter their serious attention before the war. They saw in this a possibility of developing free flight independent of motor, some combination of the glider of the Wrights and Lilienthal and the bicycle.

"They reasoned that if the Wrights and Lilienthal soared, the first by riding on the crests of gales, the other by launching from heights, they would soar by gaining the necessary 'lift' by a run along the ground. They pictured their winged apparatus rising in the air, as Orville Wright's glider rose in October, 1911, and mastering the 59-mile gale stayed in the air 9 minutes and 49 seconds. Those who have propellers in their machines even dream of possibilities of speeding up while in the air, making their propellers revolve by swift pedaling.

"Is that purely idle dreaming? I don't think so. I remember the time when Bleriot was spending his time and money in experimenting with a flapping wing machine; when the Wrights were investing their resources to develop a motor aeroplane which was considered a physical impossibility and Farman and the Voisins spent their time trying to guide from sand mounds and tumbled over like school children at play. These experiments seemed foolish, even ridiculous, and were laughed at by the world, yet today, Bleriot and Farman are among France's representative scientists and have constructed thousands of aeroplanes for the armies and navies of the Allies. And the Wrights are classed with the greatest of great men of history.

"No, aviettes are not things to laugh at. If the development bring nothing more than flying bicycles, it will have been worth the effort, for the next logical step is the flying motorcycle—which will, I believe, develop into a rather popular and useful thing and will be a stepping stone to the next step, the Ford of the air, the small aeroplane, which are now represented by dozen types ranging from 30 to 50 h.p. and from one to two passengers."

Other prizes that have been offered for the development of aviettes are: 120,000 lire in prizes by the Aerial League of Italy; 10,000 francs in one prize, known as the "Prix du Decametre," offered by Mr. Robert Peugeot, the well-known builder of Peugeot cars; and a prize of 700 francs offered by Georges Dubois-Sacour, also in France.

NEW RECORDS AND PERFORMANCES OFFICIALLY RECOGNIZED

The *Fédération Aéronautique Internationale* publish the following list of performances officialy recognized, prefacing the statement with the remark that since January 6 all the important flight records have been broken.

Official World Speed Record

Sadi Lecointe, at Villacoublay, Feb. 7, 1920, on Nieuport, 300 H.P. Hispano Suiza, 275 k. 862 per hour.

Jean Casale at Villacoublay, Feb. 28, 1920, Spad Herbemont, 300 H.P. Hispano Suiza, 283 k. 464 per hour.

France

Altitude, pilot only:—Jean Casale, at Issy-les-Moulineau, June 14, Nieuport, 9,520 m.

Pilot and one passenger:—Jacques Weiss, at Villacoublay, Aug. 13, 1919, Bréguet, 9,000 m.

Pilot and two passengers:—Jean Casale, at Villacoublay, Dec. 24, 1919, 6,700 m.

Pilot and four passengers:—Bossoutrot, at Toussus, April 1, 1919, Farman, 6,290 m.

Pilot and 13 passengers:—Bossoutrot, at Toussus, April 3, 1919, Farman, 5,990 m.

Pilot and 24 passengers:—Bossoutrot, at Toussus, May 5, 1919, Farman, 4,860 m.

Distance in straight line: Pilot and seven passengers:—Bossoutrot, from Toussus to Casablanca, Aug. 11, 1919, Farman, 1,872 k. 870.

Speed in closed circuit: Pilot only:—Bernard de Romanet, Oct. 22, 1919, Nieuport, 300 h.p. Hispano Suiza, 268 k. 631.

United States

Altitude: Major R. W. Schroeder, alone, at Dayton, Sept. 18, 1918, 9,455 metres.

Roland Rohlf, at Garden City (New York), July 30, 9.241 m.

Major R. W. Schroeder and Lieut. G. W. Elsey, at Dayton, Sept. 6, 1919, 8,616 m.

Roland Rohlf, alone, at Garden City (New York), Sept. 18, 1919, 9,577 m.

Major R. W. Schroeder and Lieut. G. W. Elsey, at Dayton, Oct. 4, 1919, 9,699 m.

Remarkable Performances

Bossoutrot, with seven passengers, from Toussus-le-Noble to Casablanca, Aug. 11; arrived at Casablanca, distance 1,872 kilometers, in 17 hours 20 min.

Lieut. Roget, with Capt. Coli, left Villacoublay, May 24, and landed at Kenitra, Morocco, 1,750 kilometres, in 13 hours, non-stop.

Alcock and Brown, June 14-16, 1919, from St. John's (Newfoundland) to Clifden (Ireland), 3,050 kilometres, in 16 hours 12 min.

Lt. Commander Read, from Newfoundland to Lisbon, halting at the Azores, May 16-27, 1919, 3,510 kilometres, in 26 hours 20 min.

British Airship R.34—Double crossing of the Atlantic with 30 passengers, July 2-13, 11,000 kilometres, in 75 hours.

BOOK REVIEWS

"THE DESIGN & CONSTRUCTION OF AERO ENGINES" By *C. Sylvester.*

It is most difficult to get a technical book that is easily understood by beginner and master-craftsman alike. This book describes and explains the details of aero engines in an explicit yet simple manner.

Copy of the book can be obtained at the Aeronautic Library, Inc., 299 Madison Avenue, New York City. Price postpaid $2.75.

THE AVIATION POCKET-BOOK FOR 1919-20 By *R. Borlase Matthews, W. H. Ex., A. M. Inst. C. E.*

This volume contains a brief, concise, and accurate analysis of the principles and practise of aviation. The book gives the essential knowledge concerning the various formulae, rules, tables and data relating to aviation work. It has been revised throughout, and brought completely up-to-date. Besides sections on newest tactics and improvements in flying there is a division which provides a key to the latest literature on aviation, another which treats of the filing of aeronautical data, and a third which is of the nature of a directory. A glossary, one of the first and most complete to be published, and one which is in accord with the latest authorities is given. Conversion tables are incorporated at the beginning of the book. Those selected have a special bearing on aviation work. Some general conversion constants, together with logarithms and slide rule constants, have also been included.

Copy of this book can be obtained at The Aeronautic Library, Inc., 299 Madison Avenue, New York City. Price postpaid $5.50.

LANDING FIELD GUIDE AND PILOTS' LOG BOOK. By *Capt. Bruce Eytinge,* N.Y. Aerial Police.

A compendium of useful information to aviators. It contains a list of landing fields and towns and cities in the Unted States that have aviation facilities. The Guide covers every State, classifying the fields as Government, municipal, commercial and emergency. The Log division of 50 pages of the book is ruled to keep records of the motor, machine and pilot.

This book for sale at Aeronautic Library, Inc., 299 Madison Avenue, New York City. Price $3.00 postpaid.

DYKE'S AUTOMOBILE ENCYCLOPEDIA. Twelfth Edition. 960 pages, 3,362 illustrations.

This book has again been revised and greatly improved and covers practically every phase of the automobile industry and deals with automobiles, trucks, tractors, motorcycles, aeroplanes, aeroplane engines, including the Liberty Engine, fully illustrated.

Many new subjects have been added to this edition, for instance, how to make electric tests of the starting motor, generator, battery, coils, magnetos, etc. The subjects are dealt with in such a simplified manner that one can almost understand by a mere glance at the numerous illustrations.

During the war this book was used extensively by our Government and was also sanctioned for use in the Schools of Military Aeronautics, England. Now used by leading automobile schools in the U. S. A., Canada, England, Australia and New Zealand.

Price $6.00. This book can be purchased at Aeronautic Library, Inc., 299 Madison Avenue, New York City.

Heat Oxygen for Planes

Washington.—The Engineering Division of the Air Service at Dayton is conducting tests on an apparatus for heating oxygen to prevent recurrence of freezing at high altitudes.

The apparatus consists of a thermostatic interrupter in connection with electric resistance coils and attached to a Prouty oxygen generator. The apparatus heats the oxygen as it leaves the exhaust valve of the container and keeps it hot until it reaches the distributer.

This prevents moisture freezing in the delicate distributer, and it also heats the oxygen again before it enters the pilot's mask. Tests so far have proved the invention of material value, but other and more severe ones will be made.

Investigation of Fatigue of Metals

Champaign, Ill.—An investigation of Fatigue Phenomena in Metals under repeated stress has just been started under the joint auspices of the National Research Council, Engineering Foundation, and the Engineering Experiment Station of the University of Illinois. The Engineering Foundation is providing $15,000 a year for two years for this investigation and the Engineering Division of the National Research Council is acting in an advisory capacity, largely through its Committee on Fatigue Phenomena in Metals. The experimental work is being done in the laboratories of the Engineering Experiment Station of the University of Illinois under the immediate direction of Professor H. F. Moore, Research Professor of Engineering Materials and Chairman of the Committee above mentioned.

Plans are laid for a two years' program of tests, and apparatus and material are already arriving for the tests. It is hoped to secure a considerable amount of data on tests of various metals including a number of tests of each metal to 100,000,000 reversals of stress. It is hoped to study the various short-time physical tests which are used for metals—such as the impact test, magnetic analysis, and short-time bending tests—to see whether any of these tests give reliable indices of the ability of the metal to resist fatigue under millions of repetitions of low stress. It is hoped that some reliable commercial test for this important property may be developed by this investigation.

A test party of four or five persons is being organized, and the University of Illinois is fitting up a special laboratory with about 2,500 square feet of floor space for the use of this investigation.

MONEL FOR ENGINE VALVES

The present day aviation engine operates at much higher temperatures than were considered possible a few years ago, One of the greatest problems in the development of such engines has been the securing of a suitable material out of which to construct the valves. The life of ordinary valves is so short and their service so unsatisfactory that an improved material is urgently needed.

In a recent paper presented to the English Institution of Automobile Engineers, the merits of different steels for this service are discussed. No mention is made, however, of monel metal, a material which recent tests at this Bureau indicate to be deserving of serious consideration for this class of work. Exhaust valves of this material have biven satisfactory performance in a 180 H. P. Hispano Suiza engine during 130 hours of running time. Of this time, the first 90 hours were devoted to tests made primarily to study the behavior of the lubricating oils. The engine was operated for periods of about 6 hours each during which time it was developing between 130 and 140 H.P. at 1800 r.p.m.

Examination of these valves at the end of 45 hours showed them to be badly pitted; they were ground just enough to reveal the condition of the valve seats and these, too, were found in the same condition, although no considerable drop in power had been noted. During the next 45 hours, the horsepower was substantially the same as during the first 45 hours, although a slight increase appeared during the first run following the replacement of the valves. The valves were then subjected to 40 hours service under conditions far more severe than those encountered in normal operation. The engine was being used in connection with a study of preignition and for this purpose was operated at 1800 r.p.m. under full load for a period of from 4 to 20 minutes. During the greater number of these runs, preignition was intentionally produced resulting in extremely high engine temperatures. An evidence of these high temperatures was furnished in one instance by the fusing of the nichrome electrode of a specially prepared spark plug, the electrode's melting point being 1500°C. In fact, one of the evidences of preignition was that when the engine was shut down the exhaust valve in a cylinder that had been preigniting would remain red for nearly a minute after the valves in the other cylinders had become black. In spite of the severity of these tests, there was no evidence of power drop from leaky valves. At the end of 150 hours of running time, the condition of the valves and valve seats appeared to be no worse than at the end of the first 45 hours. It would, therefore, seem that the pitted appearance which is a characteristic of this material has little effect on the gas tightness of the valve. [Bureau of Standards Technical Note.]

New Aeroplane Engine Muffler

After extended tests it is stated that the French Air Service has approved the Schneebeli muffler for aircraft engines, which is said to silence completely the noise of the engine and to prevent any flame from reaching the open air. The device consists of a long tube, sealed at the end, and serves as a continuation of the exhaust manifold. Around its circumference there is a series of longitudinal fins of triangular section. Communication is made from the interior of the tube to these fins by a series of holes about one-eighth inch in diameter. Along the face of the fins are cut a very large number of louvres through which the exhaust gases reach the open air.

New Portable Cranker a Success

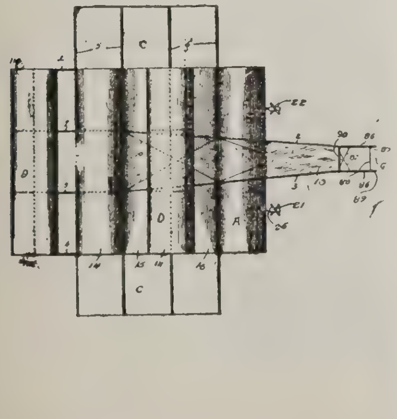
A new portable aeroplane engine cranker, designed by the Equipment Section of the Engineering Division, McCook Field, is now in use at this field. This starter can be accommodated to all types of engines by using suitable face plate castings. The engine cranker is driven by an automobile starting motor with storage battery, and exerts sufficient torque to spin a cold Liberty-12 engine at approximately 40 r.p.m. The cranker now in use at McCook Field is mounted on a 1½-ton Packard truck. The truck is driven to a position in front of the aeroplane, and the cranker is swiveled in the universal bowl so that its shaft approximately parallels the propeller axis. The automobile release is set at the starting position, and the engagement lever is then pushed forward until the face plate nearly touches the propeller. The necessary adjustments of the elevating and transversing mechanisms are then made and the bowl clamped in position. The engagement lever is then pushed forward so that the face plate engages the propeller hub nuts, and the starting switch is operated. As soon as the engine starts under its own power, the face-plate automatically recedes from its engagement with the propeller hub nuts, leaving the entire starter clear of the propeller, thereby allowing the starter truck to drive away without danger of interference.

RECENT AERO PATENTS

1,270,945. AEROPLANE-PROTECTOR. Nykyfor Hawrylasz, Tarentum, Pa. Filed Sept. 25, 1917. Serial No. 193,082. (Cl. 244—1.)

1. In combination with an aircraft having a gas bag, a bed of packed feathers surrounding the lower half thereof and a wire retaining gauze overlying the feathers and secured to the bag.

2. A device of the class described, comprising a gas bag, a layer of matter feathers surrounding the lower portion of the bag in contact with the said covering and a retaining net carried by the covering and surrounding the feather layer.

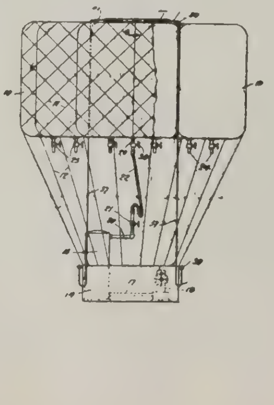


1,270,339. AEROPLANE. James S. Spainhour, Hempstead, N. Y., assignor of one-half to Sidney F. Beckwith, Hempstead, N. Y. Filed June 9, 1917. Serial No. 173,681. (Cl. 244—29.)

1. An aeroplane having mounted on its rear end a rudder and a plurality of elevators, said rudder and said elevators being identical in shape and size, the plane of the elevators intersecting the rudder and the inner edges of the elevators flaring outward to permit the rudder to swing freely between them.

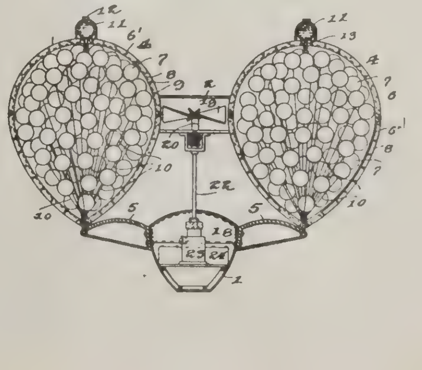
2. An aeroplane having mounted on its rear end a rubber and a plurality of elevators, said rudder and said elevators being identical in shape and size, and being interchangeable.

5. An aeroplane having a vane hinged thereto, the hinge comprising a pin fastened to a part of the frame of said vane, a tube surrounding said pin and loops surrounding said tube and fastened one loop to the frame of the vane and the other to the frame of the aeroplane.



1,270,678. BALLOON. Maxim Zavarkin, East Brimfield, Mass. Filed Mar. 9, 1918. Serial No. 221,410. (Cl. 224—3.)

1. In a balloon, a plurality of segmental gas holders arranged in a circle, a cylindrical holder adjacent to the inner ends of said segmental holders, a car suspended by said holders, means in said car for supplying gas, flexible connection between said means and said holders, inlets to all of said holders, a slide valve at the upper side of said cylindrical holder and a pair of opposed cords extending from said valve to said car whereby said valve may be manually actuated.



REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. *It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages.* AERIAL AGE *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in AERIAL AGE *for February 9th and* 16*th and by Mr. Hughes in his* 1918 *investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Col. Disque's operations, according to C. E. Dant, the largest operator on the coast, resulted in a loss in 1918 through improper sawing compared with individual operations in 1917. Lieut. Hollande, representing France, told Mr. Dant in the spring of 1918 that not more than 15 per cent of the lumber from the cut-up plant could then be used (p. 2261). Mr. Ayer, one of the largest lumbermen on the coast, said Lieut. Hollande, representing France, and Col. Beckett, representing Great Britain, told Disque what was wanted, but they did not get it (p. 2278).

Gen. Belin wrote or cabled on May 15, 1918, from Versailles, France, to Gen. Bliss, Chief of Staff, United States of America (p. 2263):

> Before the United States entered the war, shipments of wood for aeroplanes took place by means of the ordinary mechanism of orders placed with private American firms, either by French manufacturers or, later, by the French Government. After the United States entered the war, control was taken over by the Government, which resulted in substituting a central organization, the only contractor abroad, for private American establishments. These measures did not succeed in entirely stopping shipments ordered of private American firms, although they decreased them to a considerable extent and without replacing them, so far, by regular Government shipments.
>
> Whether this state of affairs is due to a slackening in American production, difficulties in railway transportation, and insufficient number of vessels chartered for the transportation of wood, measures taken by the United States to safeguard her own war supplies, or whether it is due to all these causes together, the fact remains that the first shipments of wood under the control of the American Government (arrivals distributed among the Allies from December, 1917), did not begin until early in March, 1918, and then only in a totally inadequate manner.
>
> Supplies of wood for the Air Service from September, 1917, until March, 1918, were thus entirely due to the remains of private importation. The gaps in the shipments during the last few months have seriously compromised the situation of aviation production and the situation of the Air Service is consequently such that the least thing may make a very serious matter of it.

Seriously Compromising Aviation Production

During six months, from November, 1917, to May, 1918, while Col. Disque was trying to learn the lumber business, he had "seriously compromised the situation of aviation production." In other words, he prevented private producers from dealing directly with the Allies, as in the past, and his 8-hour day, riving operations, closing of mills, and other orders and experiments, had greatly limited the production of aircraft lumber.

Col. Breece, a lumberman from West Virginia, of acknowledged experience and ability, by some unexplained circumstance, became associated with Col. Disque at Portland early in 1918 and discovered that Col. Disque was not getting "5 per cent aeroplane lumber" from logs. Col. Breece put in force changes that increased the lumber product (p. 3346) and with the Canadian output the Allies received more than they could use prior to the end of the war (pp. 1394-1395). Controversy has occurred over the value of the Vancouver cut-up plant, and several reputable witnesses, including Col. Kelly (p. 3213), testified that specification aeroplane spruce could have been produced with existing equipment. Undoubtedly that is true, but your committee believes that "cut-up" machinery improved the grade of finished lumber. Cut-up machinery, however, if properly installed, should have been placed in a half dozen mills at convenient points, and at a comparatively small cost instead of building new mills and new plants at enormous expense intended for private use after the war by favored interests (p. 100, Ryan's letter). That was worse than wasteful.

Disque Rebuffed Reputable Lumbermen

The burden of complaints from many reputable lumbering interests was that, apart from Col. Disque's lack of knowledge of the business, he ignored and rebuffed many men who had logged or manufactured aeroplane lumber and who desired to aid production. Maj. Hitchcock, Col. Disque's aid, was represented as an arrogant doorkeeper, according to testimony of reputable witnesses, and Lightner, Goodyear, Polson, and other large loggers, according to testimony, were unable to get an audience with the "Commander of the Army of the Yeon."

Mr. Russell Hawkins, one of the largest loggers on the coast, recommended by Col. Kelly for Col. Disque's job, offered to log spruce on a one-tenth of 1 per cent basis, giving any profit he might make to the Red Cross; but this was not accepted (pp. 2291-2293). Mr. Butler, Mr. Chinn and leading business men and loggers of Washington offered early in 1918 to take over cost-plus contracts from the Government direct without profit, but were repulsed until on September 12, 1918, a contract was allowed them by Col. Disque for 12,000,000 feet of aeroplane logs per month on the Blodgett tract at a total profit of "$20" on a contract involving many millions of dollars (p. 830). Mr. Ayer, a large and highly reputable lumberman, of Portland, who produced aeroplane lumber for the Allies, testified that Col. Disque directed him to adopt an eight-hour day and his scale of wages or to shut down. He shut down (p. 2279). Other witnesses testified to the same arbitrary rulings.

Mr. Storey, a lumberman of 40 years' experience, testified that the inexperience and blundering of Warren Spruce Co. delayed production for six months (p. 1816). Mr. Polson, the largest logger on the coast, a Disque witness, testified that blundering "mismanagement" delayed him four months without progress (p. 2026). Other reputable witnesses offered cumulative testimony on this point.

Frequent charges of self-interest, "sore-headedness," and lack of patriotism were bandied about by Col. Disque, Maj. Hitchcock, Col. Stearns, and others of their type, whereas the fact is that many offers of patriotic public service came to the Government from high-class, reputable business men whose chief offense lay in their protest against a grotesque military despotism on the coast, where general ignorance and petty egotism sat in places of authority. Those who bowed to this strange domination and sought to join hands in production during war, like Griggs (p. 1814), Reed, and Capt. Grant (p. 2362), Capt. Brown (p. 1814), Polson (p. 2026), and other practical business men found their own efforts embarrassed or thwarted by the spirit of narrow intolerance surrounding them.

Whatever limited success was had came about through the sacrificing efforts of big men who yielded their own business interests and judgment, sometimes with great sacrifice, to obtain whatever production was possible.

It has been no part of your committee's work to determine the merits of controversies between Col. Disque and those who were producing aeroplane lumber; but to give facts, found in the testimony, as we believe them to be.

Money Losses in Production Were Divided

An understanding reached by the Aircraft Service at Washington provided that the United States should aid our allies in getting spruce lumber for aircraft and that the total expense should be borne proportionately by the different governments according to their allotments. The proportion of spruce lumber severally allotted was fixed at the following approximate percentages:

	Per Cent
United States	34
Great Britain	31
France	24
Italy	10

(*To be continued*)

NAVAL *and* MILITARY AERONAUTICS

Aerial Photographic Maps of the Canal Zone

Recently a De Haviland -4 plane piloted by 1st Lieut. R. C. W. Blessley with 2nd Lieut. D. D. Watson, observer proceeded on an aerial photographic mission, covering an area of approximately thirty square miles, including the Gatun Road from Mount Hope to Fort Davis and around the Gatun Lock, Canal Zone. This work was done for the Department Engineers who are using the photographic maps to bring their maps up to date. During the past three or four months six such photographic maps have been completed for the use of the Engineers. All of this work has been carried on over mountainous country covered with a dense jungle which makes it almost impassable. An hour or so of aerial photography by the Air Service saves the Engineer Corps months of work on the ground.

DH-9 Aeroplane Makes Fast Non-Stop Cross Country Flight

Records for the longest non-stop flight on the Pacific Coast were broken recently when Lieut. F. D. Hackett flew from Mather Field to Ream Field a distance of 490 miles, in a De Haviland U. S. 9 plane equipped with a Liberty motor, in four hours and one minute. A new record was also established in the length of time the flight was made, this being the shortest time consumed in covering the airline distance between the two fields.

Breguet Plane Fitted With Liberty Motor

The Aviation General Supply Depot at Middletown, Pennsylvania, has mounted an American Liberty motor in a French Breguet 14 A.P.-2 aeroplane which had been received from the A. E. F.

The plane was given a test during the week and proved to be a worthy craft. Its flying speed is fully equal to that of the D.H.-4, while the landing speed is considerably slower. One of the peculiarities of this plane is its exceptional lateral stability, another being its extreme non-sensitiveness to the aileron control, while the tail surfaces are so designed as to give maximum amount of control. The plane is capable of carrying 1,000 lbs. of bombs, in addition to its regular armament of four machine guns, 4,000 rounds of ammunition, pilot and observer.

This combination appears to make an excellent machine for bombing or observation work.

Atlantic Air Fleet Returns North

The Air Detachment of the Atlantic Fleet has returned to Northern Waters from the southern base and winter maneuvers. The six F-5-L seaplanes, main battle planes of the detachment, have been in continuous service for the last six months, and though showing hard service are still in good condition.

The record of these planes demonstrates the practicality of large seaplanes for commercial use. From the time the planes left the Naval Aircraft Factory last October, they have not had hangar or flying station service; but have been cared for on the water; or on the beach. No hull failures have been experienced and wings have been rebuilt and recovered complete without removal. The planes were exposed to rain and sun in a tropical climate during the rainy season, without protection.

At present the Air Fleet is at the Naval Aircraft Factory being overhauled and made ready for more service.

In service the planes are accompanied by the "Shawmut," a naval seaplane mother ship. This ship is fitted up as a workshop, stores for spare parts, carrier for small seaplanes and quarters for flying officers and men.

Commander Leighton is in charge of the seaplanes, and Captain Steele of the Shawmut and air detachment.

Air Service Aero Squadron's Strength

The air service reports an organization of twenty-eight aero squadrons and thirty-two balloon companies including two dirigible companies, with a total enlisted strength of 6,193 men, or fifty-seven per cent. of the authorized strength of 10,794 men. In addition to these squadrons and companies there are several other units such as park companies, photographic sections, supply and headquarter detachments, etc., with a total enlisted strength of 2,642 men. A table shows that the present strength of the four Pursuit Squadrons is 488; of the sixteen Observation Squadrons 1,857; of the four Bombardment Squadrons 459; of the three Surveillance Squadrons 307; of the thirty-two balloon Companies 2,995; and of the one Construction Squadron 87.

Introduce Bill for Aviation Development Bureau

That all the aviation development activities of the Government be managed by one bureau is the proposal contained in a bill introduced in the House on April 27th by Chairman Kahn of the House Committee on Military Affairs, the plan being that while the Army and Navy are each to have absolute control of their respective air forces necessary to operation, a single bureau should be charged with the development of aviation, which would include production.

Left to right: K. J. Dooley, mechanic; Ray Cullman, pilot; Jos. Murphy, with Curtiss Oriole in which they are flying from New York to Tulsa, Oklahoma

Climb of Service Type D. H. Tested at Langley

A series of flights to determine the climbing ability of an ordinary service type DH has just been completed by Lieut.-Col. John N. Reynolds, commanding officer, Langley Field, and Captain Walter R. Lawson. A DH-4 was used on the first and second flights and a DH-4B on the third, neither plane being selected for any particular climbing ability.

A good average climb was charted which called for the first 5,000 feet to be made in five minutes, 10,000 feet in 11 minutes and 30 seconds, and 15,000 feet in 27 minutes and 30 seconds. When the first flight was made, it was noted that up to 4,000 feet the climb was very slow, due to overheating engine, but after passing 4,000 feet, a fairly good climb was made.

The third climb was a little better from 10,000 feet up, while it was about the same from 3,500 feet to 10,000 feet and on the second climb up to 3,500 feet.

These climbs were made merely with the view of determining the average climb that could be expected from a service type DH under ordinary conditions. On the second flight an altitude of 19,000 feet was reached in 45 minutes.

Testing Parachutes While Plane Spins

The Air Service Engineering Division at Dayton, O., has been conducting a number of parachute tests to determine the course taken by a man lifting off a JN-4H plane in a tail spin in a parachute.

Numbers of tests have been conducted of other methods of exit from a plane, but actual exit from a plane in a tail spin with a parachute has never been attempted. The tests were first conducted with flags of lengths corresponding to that of the service type parachute. Later a 7-foot diameter model parachute with weights was used. All tests were successful.

Numbers of accidents can of course be directly attributed to falling into a tail spin and a safe method of exit will be of great value.

Lt. Col. Stehlin to Recruit Flyers to Fight With Letts

Lieut. Col. Joseph C. Stehlin, twenty-three-year-old aviator, of Sheepshead Bay, who arrived from Russia recently, will try to enlist aviators to return with him to the Lettish army to fight the Reds. He has been on the Lettish front eight months.

Stehlin made a heroic record in the World War. He has decorations from the French and Polish Governments.

FOREIGN NEWS

Predict 10 Hour Trip from Brest to New York

Paris.—From Brest to New York in ten hours is the latest prophecy of French aviation experts following the recent exploit of Henri Roget, who covered the 280 miles from Paris to Lyons at the altitude of 6,500 meters at a speed of 150 miles an hour.

Roget is supported by a large section of French flyers in the belief that double this speed is easily attainable if flying at double the altitude with a chamber of compressed air enclosing the aviator. The process, it is pointed out, would be merely a reversal of that employed on submarines and several French constructors already are planning experimental cabins with which to demonstrate Roget's thesis.

While the chamber would increase the weight of the machine, scientists here are now flooding the newspapers with intricate calculations proving that the scheme will eventually prove feasible for public use as saving in motor wastage of petrol and from storm difficulties which are absent in high altitudes, thus more than making up for the difference in weight.

American Aviators Help Poles Crush Bolshevists

The Kosciusko Squadron, composed of American aviators fighting with the Polish army, recently made thirty-two raids and some flights more than sixty miles within the Bolshevik lines, the Americans bombing and machine gunning railroad centers and scattering propaganda in Kiev and other cities. At many points the Bolsheviki used anti-aircraft guns against the aviators and in less important places concentrated machine gun fire upon the pilots, who always attacked from an altitude of less than 2,000 feet. Two of the most important raids were led by Lieutenant Harmon Rorison, of Wilmington, N. C.

Cross-Country Race at Bournemouth, England

Considerable interest was aroused in Bournemouth by the race recently from the aerodrome, over a double circuit to Christchurch Priory. There were six entries and the winner was Sergt.-Pilot R. E. Tollerfield, M.M. (Avro-Le-Rhone), who took the prize of 11 guineas and the trophy presented by the Bournemouth Aviation Company, his time for the course of about 20 miles being 20 min. 31 secs. Capt. Matthews (Avro-Le-Rhone) secured second place in 20 min, 51½ secs., Lieut. Carter Smith (F.E.-Beardmore) third and Lieut. F. W. Knox (Avro-Le-Rhone) fourth. Every one of the entrants completed the course, but the other two were disqualified for not complying with the rules.

Chinese to Detect Smugglers by Aeroplanes

The Chinese Government intend to utilize the Handley Page aeroplanes which they have purchased for a number of adventurous undertakings apart from commercial purposes. General Timm, the organizer, of the Aeronautical Department of China, recently stated that amongst the uses to which aeroplanes will be put in civil pursuits in China will be the location of bandits in Shantung and other bandit infested provinces; location of salt and customs smugglers; coast patrols; transportation of precious metal and ore from the interior to the ports; exploration and reconnaissance of new routes—railways and highways; the running of mail services. including the carrying of important despatches between officials; transportation of officials on important missions; surveying the country and making maps, and the study of river and harbor problems.

Danish Companies Plan Aerial Service Between Copenhagen and Warnemunde, Germany

Two Danish aeroplane companies have applied to the Danish government for permission to establish a regular aerial mail and passenger service between Copenhagen and Warnemunde, Germany. Due to unsatisfactory condition of German railways, the aeroplane service would be popular.

Aeroplane Communication Services in the Adriatic

The Societa Industrie Aeronautiche e Meccaniche d'Italia Centrale (Siamic) at Perugia has presented to the National Department of Aviation a complete project for aeroplane communication services in the Adriatic. The proposed lines will be operated between Ancona, Pola, and Fiume; Fiume, Zara, Sebenico, Spalato, and Lissa; Lissa, Metcovic. Ragusa, Cattaro, Scutari, and Durazzo; Durazzo, Vallona, and Corfu; Corfu and Brindisi. These trips are to be made twice a day from south to north.

The Siamic Co. intends to use army aeroplanes accommodated for transportation of passengers and merchandise.

Commercial Aircraft Exhibition at Cricklewood

In connection with the Air Craft Deal Handley Page, Ltd., are organizing show rooms at Cricklewood for the display of commercial aeroplanes.

All kinds of aircraft from single seaters to multi-engine freight carriers will be on view.

This innovation represents the first and most complete collection of aircraft, which if required, can be flown by intending purchasers or demonstrated by the firm's pilots.

It is anticipated that representatives from all over the world will make use of this exhibition. Selections of spare parts will also be shown to illustrate the fact that the huge amount of aircraft material controlled solves the urgent question of spares for aeroplanes.

From existing stock it will be possible to ensure spares for any aeroplane for some years.

Immediate replacement of damaged parts will be possible without the weeks of delay which generally occur.

Japanese Aeroplane Engines

Nagoya is destined to become the center of Japanese aviation, according to a translation from the *Osaka Mainichi Shimbun*. The army machine works, now under construction at Chikusa, a suburb of Nagoya, will be partially completed and in operation, it is expected, by the beginning of this month, at which time the Atsuta aeroplane factory will be removed to the same place. In this factory seven powerful motors of the Salmson type are under construction, which, while nominally of 230 horse-power, actually develop 250 horse-power. The material used is wholly Japanese, and the results of tests are reported to be most satisfactory.

The Handley Page Syndicate Aircraft Deal

The syndicate, of which Mr. Handley Page is the moving spirit, is taking over 10,000 aeroplanes, 35,000 engines, enormous quantities of spare parts, and aircraft material of all kinds. These aeroplanes are the product of a large number of firms. Aeroplanes must be sold in flying condition, and although the majority of the 10,000 acquired by the syndicate are in new and unused condition, overhauls and repairs will be required. The task of inspecting and overhauling 10,000 aeroplanes is far beyond the capacity of any one firm. Mr. Handley Page's scheme is that each firm shall be asked to put its own type of machine into flying condition, the necessary spares and material being provided by the syndicate. This will provide a great deal of work for all the firms concerned, and enable them to keep their plants running during a period when they would otherwise have to close down from lack of orders for new machines. This is one of the most important aspects of the scheme. It is also expected to find a market for much of the surplus material among firms outside the aircraft trade.

Briefly the plans of the syndicate are:

1. To provide every type of British aeroplane, ranging from single-seater scouts to multi-engine passenger and freight machines.
2. To supply complete Air Forces. Such undertakings will embrace the formation of squadrons of fighting, bombing and reconnaissance aeroplanes, and the supply of hangars, mechanical transport, repair shops, searchlights, and flares. Schools of instruction will be instituted for the training of pilots and British instructors provided.
3. To inaugurate air routes in various parts of the world. Suitable machines capable of carrying passengers and freight will be supplied and organization completed for the institution of aerodromes, the training of ground personnel and the institution of meteorological and wireless services.
4. To sell aeroplanes for sporting purposes and also for business firms who wish to utilize aircraft as a means of delivering quantities of urgent mails or freight.

Barcelona Hydro-Aeroplane Meeting

The Royal Aero Club of Catalonia will hold an International Hydro-aeroplane Meeting at Barcelona from May 23 to 30, 1920.

There will be a speed contest, the "Barcelona Grand Prix," which will take place over the circuit Barcelona-Palma (Majorca)-Valencia-Barcelona (approx. 750 km.). In addition to the pilot and the petrol and oil necessary to cover the whole course, a passenger and a load of 300 kgs. must be carried. Entries must be forwarded, with full particulars of machines, etc., to the Royal Aero Club of Catalonia, Plazza del Téatro 2, Barcelona, before May 15, 1920. The entry fee is 100 pesetas. The following prizes are offered:

1st Prize—30,000 pesetas.
2nd Prize—10,000 pesetas.

An altitude contest will take place in the port of Barcelona on May 30, 1920, for which the following prizes are offered:

1st Prize—2,000 pesetas.
2nd Prize—1,000 pesetas.
3rd Prize—500 pesetas.

Prague-London in Seven and Three-Quarter Hours

Lieut. C. R. McMullin, one of the Airco pilots flying in an Airco 9 machine, arrived at Croydon Aerodrome recently from Prague, having accomplished the journey of over 700 miles in 7 hours 45 minutes flying time.

Belgium's Aerodynamic Laboratory

An aerodynamic laboratory, equipped with all the latest appliances, is to be set up in Belgium. It will be one of the most important in Europe, and will cost at least three million francs.

Appoint Assistant Commissioner for China for Aerial Derby

Dr. John C. Ferguson, Commissioner for China for the first Aerial Derby around the world, has appointed Milton O. Clark, of Canton, Assistant Commissioner for China.

London, Paris and Brussels Air Services

On the Handley Page Continental Air Services run in conjunction with Cie Messageries Aériennes, Paris, between September 2nd, 1919 and April 17th, 1920, inclusive, 1,218 passengers and 66,318 lbs. of freight have been carried over a distance of 90,299 miles.

Ship Jewels From London to Paris By Aeroplane

Opals, valued at £700 and a jade necklace worth £2,300, were recently carried to Paris in a Handley Page Commercial aeroplane. This method of conveying jewels to the Continent is gaining favour owing to the fact that the possibility of theft is extremely small. A London firm is sending consignments of valuable stones to Paris by air to be cut and polished.

A "Chow" dog was recently flown to Paris in a Handley Page Commercial aeroplane. There are increasing enquiries for the transfer of animals by air to the Continent, as air travel obviates the confinement in baskets for many hours which rail and steamship travel involves.

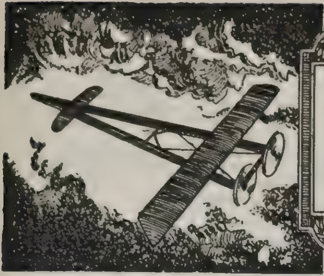
Air Services From Brussels

The National Syndicate for the Study of Aerial Transports proposes, in agreement with the public authorities, to establish regular communications by air between Brussels and the neighboring capitals.

The charge for letters not exceeding 100 grammes will be 75 centimes. Fare for passengers will not exceed 300 francs for the journey from Brussels to Paris or from Paris to Brussels, and 500 francs for the return journey, including luggage. It is expected that a service will be run in each direction three times a day for passengers, letters, and parcels.

Continue Experiments With Aviettes in France

Despite their continued disappointments, there are a few brave souls in France who are persisting in their experiments with human propelled aeroplanes in the hope that they will succeed in winning the Peugeot prize of 10,000 francs for the first "aviette" to actually fly 10 metres in opposite directions. The favorite form of machine is a bicycle fitted with wings and with the pedals operating a propeller.



ELEMENTARY AERONAUTICS
and MODEL NOTES

By John F. McMahon

The Spad Model

My article last week told of compressed air motors and their use in model aeroplanes.

This week I have drawn up a model that can hold a compressed air plant and also a rubber band plant if this one is decided on.

The model is scaled for a rubber band plant at present, the spread of the wings being 31 inches. Now if the compressed air motor is used it will be necessary to build the model twice the size, or with a spread of 62 inches.

The Spad model, because of its streamline body, can successfully carry a plant of this kind and should fly well. The tank to hold the air must be short, that is, about 12" long and 2½" diameter. The motor can be of the rotary type or horizontal opposed, whichever is preferred by the model flyer. If the rotary is used a cowling can be purchased to fit over and around the motor. This cowling is made of aluminum and is light in weight. When the compressed air plant is installed be careful to check up the balance of the machine, as a "heavy" landing on its nose would wreck the plant and model as well. Of course it is easier to balance a model with this type of plant in it, as the center of gravity is located close up to the nose of the machine and generally it comes at about the correct point.

This much for the compressed air plant. Should the model flyer decide to use the rubber band motor more care must be exercised while the model is under construction to keep the center of gravity well forward, or trouble will be encountered when the motor stick is fastened in the fuselage.

The tendency for the model to be tail heavy can be overcome by simply cutting down the motor stick to about 12" long and using a geared up propeller. These gear transmissions can be purchased two to one or three to one—the latter is the one I would suggest—and it can be purchased from the Wading River Mfg. Co., along with any other model parts needed.

The construction of this model is like the previous models shown on this page, and the modelist should proceed in the following order according to instructions:

Fuselage

The fuselage is built up of ⅛" square spruce if constructed for the rubber band power, but 3/16" if constructed for the compressed air motor. The longerons are one piece, and where the cross struts butt against them a hole is drilled with a No. 60 drill and the strut nailed and glued in place. The body as you will notice is built up square section, but the forward part has a sort of rounded section which is made by making a ring of rattan of a size to fit the inside of the cowling. The covering is pasted to this and drawn taut toward the rear which will give the shape desired. The hole for the pilot's seat can be eliminated and the turtle deck left unbroken if desired.

Wings

The wings are built up as solid ribs and spruce spars ⅛" in diameter for the rubber band model and 3/16" for the compressed air plant.

Holes are drilled in the ribs and the spars inserted and pushed through to their proper stations and glued in place. For simplicity ailerons are not provided. They are not needed, as the model will have inherent stability. The spars are close together, which causes the interplane struts to be placed close as well, and this must be so in order to have the model look like its large prototype, although it does not follow it out faithfully, as it would be impossible to design a successful model that would be a strict scale reduction of the large machine. It is necessary in many places to change the shape and dimensions somewhat, but this will hardly be noticed unless checked up carefully.

The edge of the wings is 3/32" rattan or bamboo. The covering of the wings should be fibre paper for the rubber motored model and silk for the compressed air. Paper will be strong enough for the light one but not for the heavier one, because the model sometimes lands heavily, which causes the paper to tear.

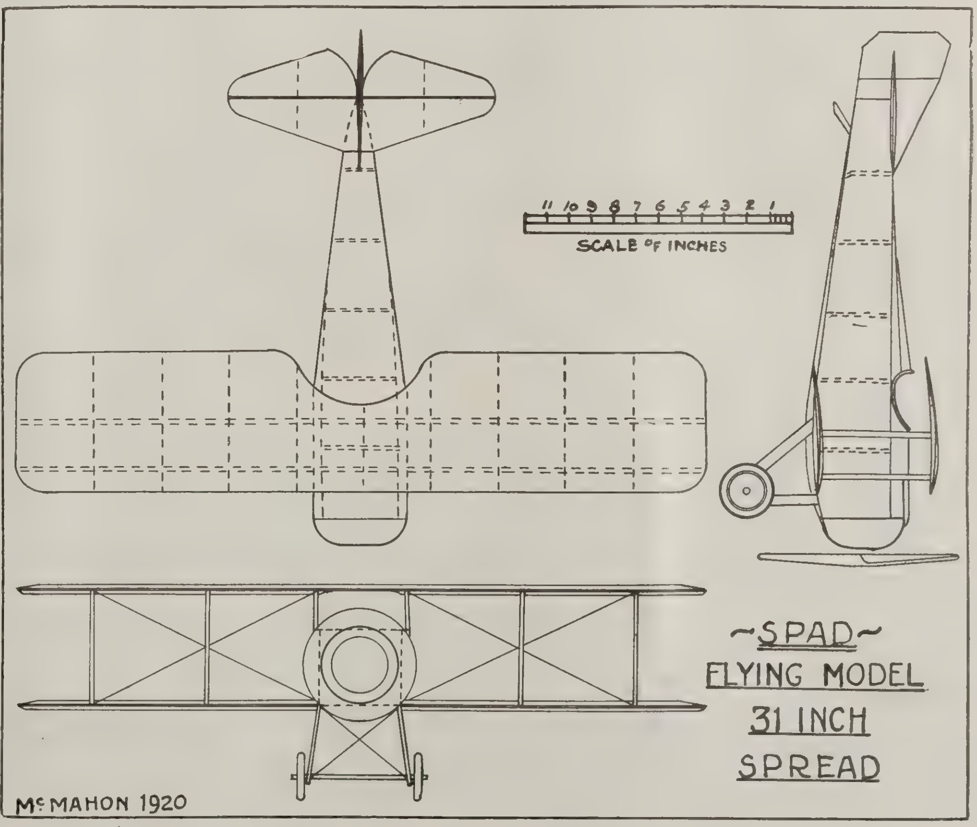
A good dope should be applied to the wings to fill the pores and shrink the material. Two to three coats should be applied, allowing each coat to dry well before applying the next.

Tail and Rudder

The tail and rudder surfaces are built up of bamboo or rattan and covered with paper or silk, according to the power plant used, and doped as well.

Landing Chassis

The landing chassis struts are made of heavy strip bamboo or tubing ¼" in diameter. If bamboo is used it should be ½ x ⅛". The axle is ⅛" rod threaded on each end. A 2" wheel is then placed on the ends and held on a nut. If the compressed air motor is used 4" wheels should be used.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

My Ideal Flier

By Mrs. Geo. W. Earle

High, high o'er the tree-tops he flies with no fear of a fall,
The noise of the motor to his heart is a call
Now for a nose-dive, and then a tail-spin,
Over and over, then up again.

High, high, you may fly with no stop or a start,
But never will you fly above my heart.
As an aviator, there is no greater,
So fly, fly, fly.

A hero you are and have proven your worth,
To carry Uncle Sam's mail, through the clouds back to earth.
It takes lots of nerve, but you do it with a grin,
So fly-away, fly-away (Gee!), watch him spin,
Away off to Washington, then back again.

Question of Judgment

Aviator.—Do you think betting is wrong?

Balloonist.—Well, the way I bet generally is.—*Minnesota Foolscap.*

Take it Away!

She.—"I suppose you had a pleasant aeroplane voyage?"

He.—"Oh, yes, everything came out nicely."—*Jack O'Lantern.*

Pilot.—"Damn Columbus."

Mech.—"What's the idea?"

Pilot.—"If he hadn't discovered America, I'd be living in Europe and it isn't dry there."—*Pelican.*

Wanted: Face Masks for Snappy-Eyed Pilots

Manager Hower of the Philadelphia Aero-Service Corporation last week was discussing some of the troubles of the aviation promoters in the present stage of the game. "Heaven knows," remarked Mr. Hower, "I never picked my pilots for beauty and on second thought, I am sure we have not robbed any beauty show, but when I see good money leaving my field, as I did the other day when a jealous fellow would not permit his fiancee to take a flight alone with a pilot, I am somewhat inclined to advertise for a cross-eyed, pock-marked and guaranteed tongue-tied pilot. I would insist on their wearing face masks but it would flatter them and in all probability improve their looks. On Sunday our ships worked until dark and judging from the face decorations of the outfit they had lunched on wagon grease and soft coal. You can search me for the reason for that fellow's jealousy."

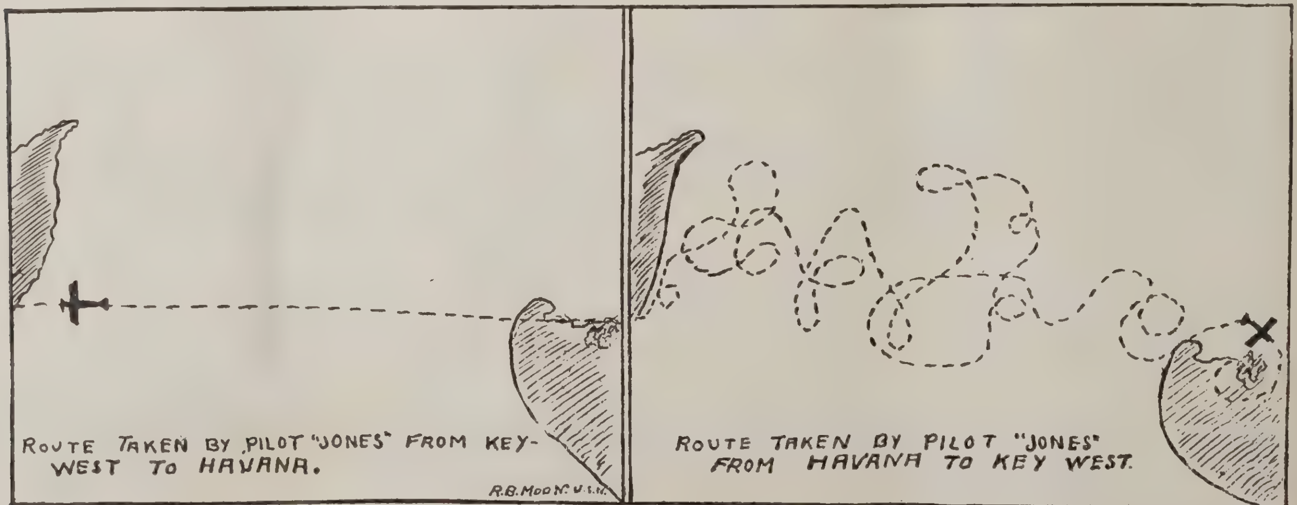
The Aviator's Bride

I wish I'd loved a shoe-clerk,
  Or a plumber—for you see
I'm sure they'd be much nicer
  Than my flier is to me—
For when the dishes must be done
  Or mother comes to tea,
He trundles out his little ship
  And flies away from me!

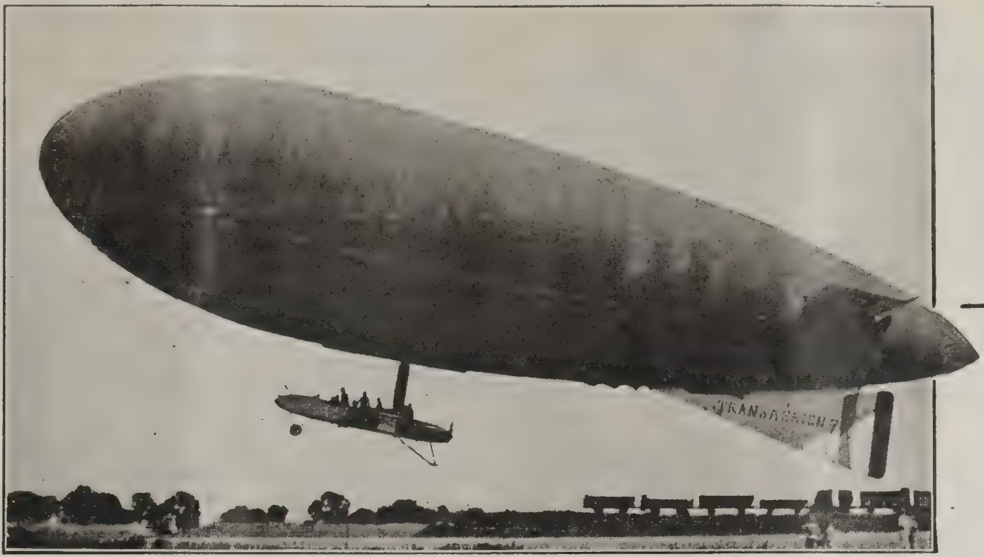
—*Tail Spins.*

Aviation Laws

New York State has been trying to draft new aviation laws. We suggest as Article 1 the compulsory wearing of spurs by all aviators. Several were noticed during the course of the war without them.—*The Home Sector.*


ROUTE TAKEN BY PILOT "JONES" FROM KEY-WEST TO HAVANA.
R.B.MOON U.S.N.
ROUTE TAKEN BY PILOT "JONES" FROM HAVANA TO KEY WEST.

Courtesy—The Naviator



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Equipped with two Renault 80 h.p. motors.

Seven Passengers, fuel for 4 hours, Speed 45 miles per hour. Size 145 feet long. Spare motors and spare parts.

$20,000 F.O.B. New York

SPHERICAL BALLOONS FOR SPORT
KITE BALLOONS FOR ADVERTISING

All of these balloons are made of special Rubberized Fabric insuring Greatest Efficiency and Safety In the Use of Hydrogen Gas.

Correspondence invited with Aero Clubs, collegiate bodies, concerns planning passenger carrying, aerial transportation and advertising business.

Pilots holding F.A.I. Dirigible and Spherical Balloon pilot certificates desiring to participate in ballooning activities, kindly write stating their qualifications.

AMERICAN DIRIGIBLE BALLOON SYNDICATE, INC.

25 WEST 43rd STREET, NEW YORK CITY
ESTABLISHED 1913
Telephone—Vanderbilt 1955

DIRECTOR: C. C. WITMER (Formerly Commander U. S. N. F., Superintending Constructor of Aircraft)

(*Continued from page* 318)

Representatives of the Aircraft Industry Attending the Third Pan-American Aeronautic Congress and Exposition

Glenn H. Curtiss, W. W. Mountain, General Manager, Maurice Connolly, General Sales Manager, Curtiss Aeroplane & Motor Corporation; Alfred W. Lawson, President, Lawson Airline Company; John M. Larsen; Major John Inwood, General Manager, C. S. MacDonald, Assistant Manager, Interallied Aircraft Corporation; William L. Brackett, Aircraft Transportation Corporation; William H. Workman, President, Aircraft Sales Corporation; Captain Horace Wild, Nebraska Aircraft Corporation; Horace Keane, President, Horace Keane Aeroplanes; Dr. G. Cantu, representative of Caproni Manufacturing Company; H. H. Hills, Assistant General Manager, Packard Motor Car Company; James V. Martin, West Virginia Aircraft Company.

Gio Ansaldo & Company; A. E. F. McCorry, Cantelever Aircraft Corporation; Mr. Bellanca, Bellanca Aircraft Company; Henry Huss, Second Vice-president, Maryland Steel Company; W. E. Boeing, Boeing Airplane Company; B. Ball, General Manager (Georgetown Station), Boeing Airplane Company; James Levy, James Levy Aircraft Company; Ralph Layman, Aero Import Corporation; William G. Ranels, Bristol Aeroplanes; Harry E. Tudor, Maryland Pressed Steel Company.

W. Wallace Kellett, Farman Aeroplanes; James McKettrick, Sopwith Aeroplane Corporation of America; Paton McGilvary, Curtiss Aeroplane Company of New England; G. S. Ireland, Curtiss-Eastern Aeroplane Co.; J. A. Bottumly; M. K. Johnson, Curtiss-Johnson Aeroplane Co.; John P. Davies, Curtiss-New York Aeroplane Co.; Floyd J. Logan, Logan Aviation Company; J. H. Thompson, Thompson Aeroplane Co. of Detroit; G. G. Garrison, Chattanooga Automobile Co.

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(*Continued from page* 324)

maximum performance required and is of benefit in minimizing air intake turbulence.

In warming up a cold engine when a richer mixture is necessary, the cone A may be dropped slightly, forming a variable venturi. With the cone in this restricting position one may readily get away while his engine is still cold. Thus, in reality, the Claudel acts as a double carburetor—one of small venturi for normal driving, and, with lowered cone, another of full engine capacity.

The advantage of the Claudel cone over the common type of butterfly strangler valve, placed some three or more inches ahead of the fuel discharge nozzle, is very evident. In the latter type, all of the dead air lying between the nozzle and the strangler valve must be exhausted before fuel will begin to flow. In the Claudel type, suction on the nozzle is instantaneous.

When the common type butterfly strangler is only slightly open (condition when warming up), the small amount of air passing the fuel discharge nozzle has little or no velocity and hence can pick up very little fuel. Fuel, however, is discharged because of the greater pressure existing in the float chamber than in the mixing chamber, and, instead of being picked up by the air, this raw fuel runs down to the butterfly strangler, where the air velocity is highest, there to be only partially vaporized and carried into the engine. In the Claudel type, on the other hand, an emulsion is discharged from the diffusor nozzle where it is immediately carried upward by the air entering at high velocity through the small, annular, streamline passage between the cone and the venturi.

Aeroplane Altitude Corrector

On the Claudel aeroplane carburetor the air cone, in much the same design, is used as an altitude corrector. Due to the lesser density of the air at high altitudes and the consequent lessened oxygen content of a given volume, it is not necessary to supply the same amount of gasoline for complete combustion as at ground level. Hence the flow of gasoline must be checked to secure the desired economy.

In the Claudel aeroplane carburetor a venturi is installed several sizes in excess of the capacity required at ground level. The streamline cone is then raised and adjusted in the position of best performance at ground level. When the plane reaches an altitude of several thousand feet the pilot lowers the cone progressively as he ascends, enlarging the venturi, decreasing the suction on the diffusor and retarding its delivery. Full power is thus obtained without waste of fuel. This corrector has been used with great success on Claudel aviation carburetors during the last year of the war and subsequently.

A High-grade Instrument

The Claudel is a very high-grade carbureting instrument built in a number of standard S.A.E. vertical sizes. A horizontal model will be announced later. Special models, however, for special installations are built to order, including aeroplane and duplex designs.

The Claudel carburetor is highly finished and carefully built for quality performance and appearance, and is universal with regard to levers and flange positions.

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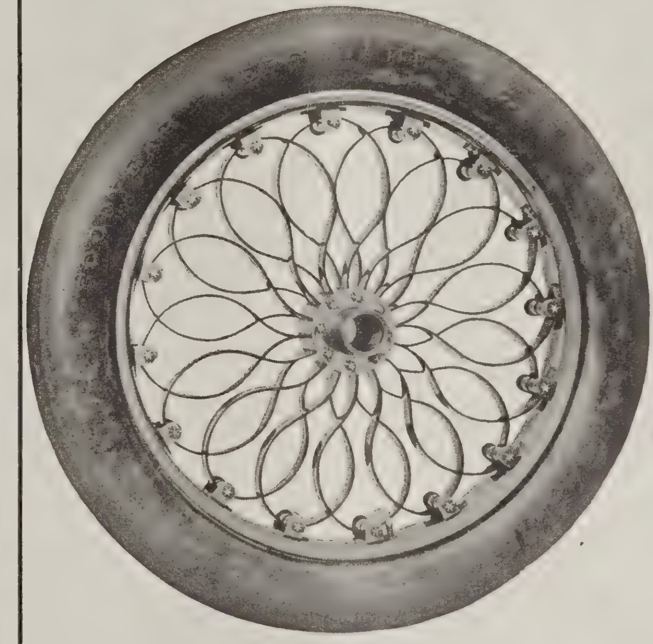

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Wing Span: 28 ft. Length overall: 18 ft. 6 in. Height overall: 7 ft. 2 in. Weight: 500 lbs. Useful load: 500 lbs. Safety factor: 10. Speed with 45 h.p. (with Pilot only): 100.5 m.p.h. With passenger: 96 m.p.h. Climb (Pilot only): 800 ft. per min. With passenger 620 ft. Landing Speed: 30 m.p.h. Ceiling: 17,000 ft. Gas consumption per hour: Full Speed: 28 lbs. Economic Speed: 17 lbs. Cruising range: 350-450 miles. Deliveries in order rotation.

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MARYLAND PRESSED STEEL CO. (AIRCRAFT DEPT.)
HARRY E. TUDOR, Sales Manager 299 MADISON AVENUE, NEW YORK CITY

Aero Service Station in St. Paul, Minn.

An aeroplane service station has been established in St. Paul, Minnesota, by the Pioneer Aeroplane Service Co. of that city. They carry a complete stock of aero supplies and acessories, and can furnish aeroplanes at a moderate rental.

This company has a flying field of a hundred acres, located one mile east of the State Fair Grounds, adjoining Como Park, and a cordial invitation is extended to all pilots to use the field. They are prepared to render prompt and efficient service to all fliers.

Canadian Aerial Services

The Canadian Aerial Services, Limited, which was organized and incorporated during the past winter has commenced operations with the opening of the flying season. The aerodrome at Hampstead, from which their various services are being conducted, is ideally situated in the western suburbs of Montreal.

The company is equipped to handle almost any class of aerial service. They have organized a sales department, and special service department for private owners, but are featuring the pleosure flights. The photographic department is also in operation, and Montrealers are able to secure aerial photographs of their city.

The directorate of the company includes R. B. Daville, J. H. St. Martin, A. E. Walford, and N. E. Ohman, all of whom have had considerable overseas service, as well as the necessary business experience.

Speed Boat Makes Record With Airship Engine

Paris.—A speed of 74½ m.p.h. is claimed to have been attained on the half-mile basis by the Despujols gliding boat, which is a stepped hydroplane, fitted with a Sunbeam 12-cylinder 450 hp. airship engine, similar to those used aboard the transatlantic airship. The engine runs at 2100 r.p.m., but the screw is geared up to 3000 r.p.m. This is the first time a geared-up screw has been used, the long accepted theory being that cavitation set up at 1800 r.p.m.

Aeroplanes Carry Freight to Minneapolis Aeroplanes Carry Freight to

Two Curtiss standard aeroplanes left Roosevelt Field, L. I., carrying 800 pounds of merchandise on a flight to Minneapolis. This is the longest commercial freight-carrying flight ever undertaken in this country.

The two machines will carry women's wear for the Dayton Company, of Minneapolis, one of the largest dry goods store concerns in Minnesota. The Dayton Company has purchased the aeroplanes also and will use them to deliver merchandise to customers in the state.

The planes which are equipped with Curtiss K-6 engines are expected to make the flight in eighteen hours' flying time. The route will be by way of Albany, Madison, Wis., and Minneapolis.

The pilots are Charles S. Keyes and R. S. Miller.

American Aces Fly With Polish Aviators

With the signing of the armistice more than one American aviator's heart sank, for all that peace meant to him was the closing of the doors to opportunity for high adventure and glory. A few of them decided to cast their fortunes with the nations at war with the Bolshevists. Among these were a number of American aces, who are now with the Polish armies. Most of them have been up near the Lithuanian front during the past winter, but a few have had some experiences in the Ukraine.

An illustration of the spirit of the new republic in bravely struggling to keep up its morale, especially along educational and progressive lines, is seen in the establishment of the Polish Aviation School in Warsaw, where a number of fine German aeroplanes, the spoils of war, have been offered to the student aviators. The German planes are employed almost exclusively in patrolling the Polish frontiers, and it is the ambition of every aviator to become so proficient that he may be entrusted with one of these machines.

High praise for the American aviators is given by returning American Red Cross officers, who have been engaged in helping the plucky republic to fight Bolshevism, starvation and epidemics by issues of food, medicines and clothing.

Aero Association in Manhattan, Kansas

The Manhattan Aero Association of Manhattan, Kansas, was recently organized. The membership consists of ex-service officers and men of the army, navy and marine corps from the city and from the faculty and students of the Kansas State College.

Several of the members are owners of aeroplanes and a fund is being collected for the development of a municipal landing field to be located northeast of the city.

Much interest and enthusiasm has been created through the efforts of the organization. W. A. Schaubert, formerly captain in the U. S. Air Service, is president of the association.

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AERIAL AGE WEEKLY

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Atlantic City Show Number

UBLISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
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In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

Aerial Transport Service

which, it is hoped, will eventually serve all of the important cities on the North American Continent.

The plans for this service have been developing for months and will vitally influence Civil, Commercial and Military Aviation throughout the world.

These plans are worthy of the confidence and support of all classes of Citizens, City, County, State and National Officials.

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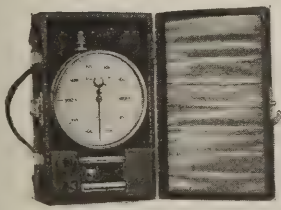

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AERIAL AGE WEEKLY

VOL. XI. MAY 24, 1920 NO. 11

TABLE OF CONTENTS

PAGE
Brilliant Gathering Marks Opening of Third Pan-American Aeronautic Congress 355
The News of the Week 358
Aerial Express Company Announces Gigantic Program of Seaplane Lines 359
Aeroplanes and Motors Exhibited at Atlantic City 359
The Aircraft Trade Review 360
U. S. Aerial Mail 361
The Rausie 175 H.P. Aero Engine 362
The Glenn L. Martin New Type Navy Torpedo-Plane 367
Pioneer Single-Seater Sportplane 370
Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures 372
Naval and Military Aeronautics 373
Foreign News 374
Elementary Aeronautics and Model Notes 375
Aeronitis 376

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ANNOUNCEMENT

Curtiss

Member Manufacturer's Aircraft Association

Schools

The Curtiss Aeroplane and Motor Corporation has reopened its flying school at Garden City, Long Island, for instruction. Courses in motor and plane construction and repair, and theoretical courses in elementary aerodynamics, cross country flying, instrument reading, etc., will be given in addition to actual flying instruction under the supervision of pilots who have had actual experience in school work.

Aerial Photography

The Curtiss Aeroplane and Motor Corporation has inaugurated a Division of Aerial Photography. With the best of equipment and a staff of experts in addition to an organization of distributors in every state in the Union, it is in a position to undertake assignments in any section of the country.

Passenger-Carrying

The Curtiss Aeroplane and Motor Corporation has resumed flying operations at the Curtiss Flying Field at Garden City, Long Island. Dependable Curtiss aeroplanes, manned by experienced and careful pilots, are available for flights, cross country work, aerial trips over the city, and aerial advertising. Special rates made to parties of five or more people.

For quotations or information, write or telephone

CURTISS AEROPLANE *and* MOTOR CORPORATION
C. S. JONES, *Mgr. Dept. of Flying Operations*
Garden City, Long Island, New York
Phone Garden City 1580

The America Trans-Oceanic Company, Curtiss distributor for Greater New York and Florida, has reopened its school for instruction in boat flying at Port Washington, L. I. Flying operations will be under the supervision of David McCullough, pilot of the NC-3 trans-Atlantic flier.

The Curtiss Flying Station at Atlantic City is now in operation, with facilities for instruction in land and water flying, passenger-carrying, tours and aerial photography.

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VOL. XI NEW YORK, May 24, 1920 No. 11

BRILLIANT GATHERING MARKS OPENING OF THIRD PAN-AMERICAN AERONAUTIC CONGRESS

Group of progressive Americans organizing AERIAL TRANSPORTATION LINES throughout the United States, unable to get deliveries of aeroplanes of American manufacture, acquire large number of aeroplanes from British Government.

Transcontinental Aerial Transport Lines to be Established in July with Liberty Motor Aeroplanes—Commander Bellinger, U.S.N., Colonel Hartz, U.S. A., Mr. Jordan, of the United States Postal Aerial Mail Services to be in charge of operation of Air Lines—3,000 surplus British aeroplanes and 5,000 aero motors to be sold in the United States at bargain prices encourage use of aeroplanes for everyday purposes.

THE Third Pan-American Aeronautic Congress & Exposition opened at Atlantic City on May 20 under most favorable auspices and abundance of official expressions and large attendance of representatives of various Governments, Aero Clubs, Chambers of Commerce, and scientific, educational and industrial bodies representing different countries and different states and cities.

President Wilson's Radio Opens Congress

The Congress was opened by radio by President Wilson from the White House, the message being received on the radio receiver mounted on a large seaplane which formed part of the United States Navy's impressive exhibit. The message was received by Commanders J. D. Robnett and H. C. McCay, U. S. N., in charge of the naval exhibit.

The delegates and aeronautic authorities then proceeded to the Congress Hall at the end of the Steel Pier where officials of the Aero Club of America, the Aerial League of America, Aero Club of Atlantic City and the Pan-American Aeronautic Federation delivered welcome addresses, which were followed by addresses from delegates and cables and radio messages received from notables from different countries.

In greeting the delegates, Colonel Jefferson De Mont Thompson, President of the Aero Club of America, and Alan R. Hawley, Chairman of the Contest Committee stated that within a few days important announcements will be made regarding a country-wide system of aerial transportation which is under organization and which will insure aerial transportation throughout the United States this year.

"This gigantic plan was originated and organized and is controlled by Americans and is to give America the distinction of having established the first system of aerial transportation on a real, substantial business basis, with every assurance of permanency," said Mr. Hawley.

"Inability on the part of American aircraft manufacturers to make deliveries this year of the large number of large aeroplanes needed for these aerial transportation lines, forced the organizers to acquire British aeroplanes to start these lines. I am glad to learn that there are also to be used French and Italian aeroplanes, as it is quite proper that the combination of Allied aviators and aeroplanes which contributed substantially to winning the war should now operate in this stupendous effort to demonstrate the value of aircraft for utilitarian purposes, to solve difficult problems of transportation."

That the Latin-American countries need aircraft in large number to solve problems of transportation was stated by representatives of different Latin-American countries. The Cuban representative, Mr. Victor Hugo Barranco, announced that the Cuban aerial transportation company, "Compañia Aerea Cubana" of Havana, Cuba, capitalized at $1,200,000, is completing a chain of flying fields throughout Cuba and the aeroplanes and personnel are ready to start operation in the near future. Mr. Barranco extended the greetings of General Menocal, the President of Cuba, to the Congress.

In his message, Mr. Alberto Santos-Dumont, the Brazilian sportsman and aeronautic engineer, who spent over one million dollars in aeronautics since 1900 when he constructed the first dirigible which flew around the Eiffel Tower in Paris said, "North and South America once more join hands for the advance of aeronautics in the Third Pan-American Aeronautic Congres and Exposition being held at Atlantic City. The three organizations under whose auspices this important event is taking place are to be congratulated on the warm spirit of co-operation existing between them that makes possible the grand success of such an immense undertaking. May the same fine spirit of co-operation animate the peoples of all the countries of the American continent, until all these countries are knit by airways and these airways teem with planes and dirigibles. Aerial navigation will knit the states of the western hemisphere into an integrally united, co-operating and friendly combination, allied for well-being in sport, trade and commerce, as well as for strength in time of possible war."

Addresses were delivered by and mesages of greetings were received from scores of high government and aeronautic authorities, which will be published in the next number of AERIAL AGE.

Twenty-six Countries Represented by Delegates

Among the prominent delegates who attended the lunch at the Traymore and the opening of the Congress were: Air Commodore L. Charlton, British Air Attache, Captain de Lavergne, French Air Attache, Lieut. Colonel A. Guidoni, Italian Air Attache, who also represents the Aero Club of Italy, Lieut. Colonel J. S. Scott, representative of the Canadian Air Board, Minister Calderon of Bolivia, Don J. Antonio Lopez Guiterrez, Minister from Honduras, Senor Don J. E. Leferero, Charge d'Affaires, of Panama, Vice Consul Cayelano de Guesada, of Cuba, General Brynk, military attache of Poland, Lieut. Commander Utgoff and Lieut. Korvin-Kronkovsky, Russian naval and military attaches.

The Aerial Transport Corporation which bought 500 large British aeroplanes when it could not get deliveries of American aeroplanes with which to establish a gigantic country wide system of aerial transportation is represented by Lieut. Commander P. N. L. Bellinger, U. S. N., who was pilot of the NC-1; and Lieut. Col. R. S. Hartz, who flew around the rim of the United States. They have an extensive exhibit of aeroplanes and motors coming on motor trucks from New York, due to arrive tonight, to be put on the Steel Pier.

Illness prevented the Brazilian Ambassador from attending, but he sent his cordial wishes. Brazil was represented by Senor Raoul Santos, Brazilian sportsman, who went up the River of Doubt with Colonel Roosevelt and is planning to fly from Portugal to Brazil for the $40,000 prize offered by the Portuguese Government for the first flight from Portugal to Brazil.

Ambassador Le Breton of the Argentine Republic, who is temporarily away from Washington, sent his greetings to the Congress. Ambassador Pezet of Peru also sent his greetings.

Second Assistant Postmaster General Praeger sent his greetings from California, where he is establishing the terminal for the transcontinental aerial mail line. Hon. John Barrett, Director of the Pan-American Union, who is away from Washington, also sent his greetings.

From the Japanese Ambassador, Hon. K. Shidehara, who was unable to come, came the following message: "Japan is watching with profound admiration the brilliant part which the United States has played in the advancement of the science and art of air navigation to the common benefit of all humanity."

Other authorities include Commissioner of Docks of New York, Murray Hulbert, who was spokesman of the aeronautic movement when he was member of Congress, Commander J. D. Robnett, U. S. N., and Lieut. Commander H. K. Mackay, U. S. N. R. F., who are in charge of the naval exhibit on the Steel Pier; Hon. John B. Lennon, Commissioner of Conciliation of the Department of Labor; Brigadier General Robert K. Evans, U. S. A., Lieut. Col. John D. Carmody, U. S. Air Service; Major Thomas S. Baldwin, Rear Admiral Walter N. Little, U. S. N., Major Wm. A. Scully, A. S., representative of the Department of State; Colonel Jefferson de Mont Thompson, chairman aviation and president Aero Club of America, Commission of New York State; Lieut. Godfrey L. Cabot, President Aero Club of New England; Henry Woodhouse, Vice-President, Aerial League of America; Augustus Post, Secretary Aero Club of America; Lieut. L. Bruce Foster, President Washington Aviators Club; Major John G. Winant, delegate from the state of New Hampshire; Joseph A. Steinmetz, president Aero Club of Pennsylvania; Major A. B. Lambert, and Randall Foster, delegates Missouri Aeronautical Society; Major B. H. Mulvihill, president Aero Club of Pittsburgh; Major A. W. Harris, president Aero Club of Cleveland, and the Ohio Aviation Association; Albert T. Bell, president Aero Club of Atlantic City; Glenn H. Curtiss, noted aeronautic engineer and manufacturer; William H. Workman, representative of the Aircraft Sales Corporation, which is exhibiting a number of aeroplanes and motors at the Steel Pier; M. Irving, inventor of the Irving Aerial Life Preserver, which is exhibiting at the Steel Pier and will be demonstrated at the Airport on Saturday. The names of other prominent authorities attending the Congress were printed in the last isue.

Four prominent women delegates at the Congress are: Miss Elena Calderon, daughter of Senor Y. Calderon, Minister from Bolivia, who came as official delegate from Bolivia, with Minister and Mrs. Calderon; Mrs. William Allen Bartlett, of New York, who has guided women's aerial activities for the past five years and is an officer of the Aerial League of America; Mrs. A. S. Abell, delegate from Baltimore, and Mrs. Glenn H. Curtiss, wife of the noted aeronautic engineer.

Captain Ladislas Marszewski, military attache of the Legation of Poland, Major Granville A. Pollock, formerly of the Lafayette Escadrille, now commander of the New York Aerial Police; Mr. E. B. Rosa, Chairman National Safety Code Committee of the American Engineering Standards Committee, John J. Jordan, Aerial Mail Department, U. S. Post Office; John M. Larsen, President J. M. L. Aircraft Corporation; C. H. Kirkham, noted aeronautic engineer; Lieut. Raffe Emerson, U. S. N., dirigible balloon expert; Lieut. Col. H. M. Hickam, A. S. A., representing General Mensher; Dr. R. S. McElwee and Mr. E. T. Chamberlain, representing the Department of Commerce.

Aerial Transportation Keynote of Congress

Aerial Transportation was the Keynote of the opening of the Congress, due to the announcement of the Aerial Transport Corporation's plans and the arrival of the British Aeroplanes which are to be used for the transport lines until suitable American aeroplanes can be had. The announcement of this gigantic prospect follows:

How a group of progressive Americans, including prominent ex-army and navy aviators, tried for months to get American aeroplanes with which to establish aerial transportation lines throughout the United States, and being unable to get deliveries of American aeroplanes this year, arranged for the purchase and bringing to the United States of 3,000 surplus British aeroplanes; and have already received bids for over 5,000 aeroplanes from American aviators and people organizing aerial transportation lines who are anxious to secure aeroplanes for commercial purposes and sport, was announced at the opening of the Congress.

The group which is organizing this stupendous system of aerial transportation lines throughout the United States and has made this record purchase—which is the largest purchase of aeroplanes ever made by anyone excepting Government—includes leading ex-army and navy aviators, among them connected actively and in an advisory capacity are LIEUT. COMMANDER P. N. L. BELLINGER, U. S. N., who flew across the Atlantic as Commander of the NC-3 and is one of the oldest naval aeronautic experts; MAJOR A. W. HARRIS, late of the United States Air Service; COLONEL R. S. HARTZ, late of the United States Army Air Service, who flew around the rim of the United States; JOHN A. JORDAN, Chief of Construction, the United States Aerial Mail Service, who took charge of the Aerial Mail Service under Second Assistant Post Master General Praeger, at its very inception.

The plans for aerial transportation lines to be established throughout the United States have been under organization for the past six months, but the organizers at the very start found themselves perplexed by the fact American aircraft manufacturers could not supply the large aeroplanes needed to operate these lines on a permanent and economic basis. Every American manufacturer capable of supplying large aeroplanes, of an economical and practicable use, was written to and seen and was asked to bid to supply the large aeroplanes needed for the aerial transportation lines, but they were indilerent or too busy or not able to construct the proper type of aeroplanes to take a contract to supply even one dozen of these large aeroplanes, which would be the minimum number with which a transcontinental aerial transportation line could be operated. After spending months in preparation and worry over the inability to get deliveries of American aeroplanes, the organizers were forced to consider buying British, French or Italian aeroplanes with which to start the transportation lines while arranging for the production of several large American passenger carrying aeroplanes, bids for which are now being invited from American aeroplane constructors.

A member of the group in charge of completing the arrangements for the establishing and operating of the transportation lines gave the following additional information regarding the project:

"After studying the operation of aerial mail in this country and of aerial transportation lines in England and continental Europe, we developed a plan which divides the United States into a number of zones, each zone to have a number of aerial transportation lines, all to be part of, and feaders to a system of transcontinental aerial transportation lines which will be the first to be established.

"We were very anxious to start these transportation lines with American aeroplanes, but after losing months in negotiations, and losing the opportunity of starting the transcontinental lines this May, we had to compromise and decide to use the large British aeroplanes which could be used immediately.

"These aeroplanes are 'surplus' British military machines and will be suitable for transportation of merchandise and will fill the gap until we get special passenger carrying aeroplanes constructed for the transportation of passengers.

"In our anxiety to start the air lines with all American aircraft, we communicated with all the American aircraft manufacturers and visited all the plants, making suitable aircraft for transportation and negotiated for a number of months with different American manufacturers, only to be told by each of them that the large aeroplanes needed for these aerial transportation lines could not be obtained this year. We were told by the manufacturers that at best, only a half a dozen aeroplanes could be obtained by the end of 1920, because those manufacturers who made such types of aeroplanes, like the Curtiss Corporation, the Martin Corporation, the Lawson Corporation ,and several other firms were filled to their capacity with orders from either individual buyers of aeroplanes, companies planning air lines, or army and navy business.

"We were anxious to have American aeroplanes to start these aerial transportation lines, especially because we needed fifty large aeroplanes and the necessary spare parts to insure permanency to these lines and flying daily upon a schedule time. Our entire plan was based on our being able, during the first year, to conduct our lines on schedule time without cessation, as we want to demonstrate the absolute dependability of aerial transportation, and to do this the continent requires fifty aeroplanes with the necessary spare parts and with duplicate motors to keep them in constant service.

"After months of negotiations, finding that we were unable to secure American aeroplanes this year, and finding that, if these air lines were not established this year, we would be forestalled by aircraft lines starting from CANADA to the UNITED STATES, from CUBA to the UNITED STATES, and being anxious to see aerial transportation lines started from the UNITED STATES to ELSEWHERE first, we communicated with various allied aircraft manufacturers, asking what deliveries they could make immediately so as to enable us to start the first air lines in June, and the transcontinental air lines in July. The allied manufacturers were prompt in responding and offered to make immediate deliveries of large aeroplanes in sufficient quantities to enable us to establish the aerial transportation lines immediately.

"While negotiations were going on, Mr. Handley Page arrived in the United States and very soon thereafter a cablegram was received from England stating that the British Government would sell out its entire aircraft equipment which had cost approximately $1,000,000,000 and of which Mr. Handley Page had been put in charge of disposing.

"Within forty eight hours of this announcement, we saw Mr. Handley Page and promptly bid for 100 of the large British aeroplanes to be used in establishing the air lines and secured an option on them.

"Within forty eight hours the publication of the announcement that Mr. Handley Page was in charge of the disposing of the 'surplus British aircraft materials' bids were received by telegraph, letter and telephone for over 5,000 aeroplanes and within a week, while Mr. Handley Page was in the United States, he received bids for over 10,000 aeroplanes from companies and individuals in the United States, Canada, South and Central America.

"Mr. Handley Page cabled to England to ascertain the available number of aeroplanes. The answer stated that orders had been received in England for aeroplanes from a large number of the smaller countries and that there were only 3,000 aeroplanes available for the United States, and these could only be had if the order was placed immediately, otherwise they would be sold to the first comers.

"To make sure that our opportunity of getting the large aeroplanes for aerial transportation would not be lost, we made a bid for the entire 3,000 aeroplanes with the necessary duplicate motors and spare parts and which Mr. Handley Page promptly accepted and turned over to us the prospective orders and bids for thousands of aeroplanes which he had already received and agreed to let us form the organization needed to dispose of the 3,000 aeroplanes and the thousands of motors and accessories as we saw fit.

"The contract was promptly closed and we expect to have the aeroplanes for the transcontinental aerial transportation lines within a month. These air lines will be operated by the AERIAL TRANSPORT CORPORATION.

"As our group has enough to do with the establishing and operating of aerial transportation lines, we did not go further than to secure the aeroplanes, motors and spare parts, which we need for our transportation lines. The surplus aeroplanes, motors, accessories, spare parts and instruments have been taken over by the Aircraft Sales Corporation which will sell them to individuals and organizations in the United States, Canada, Cuba and Central America at bargain prices.

"It has been agreed that we should permit aviators, aero clubs and commercial organizations throughout these countries to have the materials at the lowest possible prices, so that the world can test the aeroplanes for aerial transportation and for the hundred and one uses to which aeroplanes can be put. By so doing, we will create a demand for the later improved types of aeroplanes which will give better service and in time will be more economical to operate.

"These 'surplus' are the very best military aeroplanes and are equipped with the very best motors. But they were built during the past two years and are not as economical or as well adapted to aerial transportation as the aeroplanes that could be built today, would be. But if we let the world have them cheap enough, to test the value of aeroplanes for utilitarian purposes, we will create a demand for the newer and better types and thereby create a PERMANENT BUSINESS FOR THE AERONAUTIC INDUSTRY.

"In order to be able to manufacture aeroplanes of the right type for passenger, merchandise and mail services, and in order to secure the necessary finance for this purpose and further, to solicit the support of the legislative body of our Government, public opinion must be awakened to the many scores of uses of the aeroplane and this can only be accomplished by getting people and merchandise into the air and to use the air for commercial purposes, and this can only be done by placing the aeroplane in the reach of all throughout the world.

"The Ford Motor Car made the motor car industry possible simply because of its one asset which was being cheap and had it left for the higher priced motor cars to develop the motor car industry to what it is today, the motor car and motor truck industry would not be enjoying the position in the civil activities and transport work as it is doing at the present day.

"This has been proven during the past year by the sale of the 2,700 low powered training American aeroplanes purchased by the Curtiss Company eight months ago, which were sold so fast that it bewildered even the most optimistic prophets. It was also proven by the quick sale of 400 low powered Canadian training aeroplanes.

"These training machines which could not give 25% of the service for aerial transportation and other uses that can be obtained from present day aeroplanes, were quickly bought and used and they demonstrated the usefulness of aeroplanes so well that hundreds of orders for more efficient aeroplanes were placed and are keeping the American aeroplane manufacturers, like the Curtiss Company and others, working two shifts a day.

"It will be a problem to decide to whom shall go the few hundred small aeroplanes out of the lot of 3,000 which cannot be used for aerial transportation lines. All the prospective buyers intend to use these aeroplanes for various useful purposes, a great number being ex-army and navy aviators who wish to engage in 'joy riding,' commercial aerial photography and similar purposes in different parts of the country.

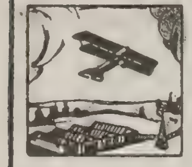
"From the telegrams and letters received, it would seem as though every city, large and small, in the United States has several aviators or business interests who wish to establish air lines.

"Some fancy offers have been made by people who want to buy some of the large aeroplanes to use for aerial transportation. These people have to be disappointed because there are less than 500 large aeroplanes in the 3,000 British surplus and all of these are needed by the AERIAL TRANSPORT CORPORATION for establishing and operating permanent aerial transportation lines throughout the United States.

"The reason that there are so few surplus British aeroplanes is that the British Government decided to sell only those aeroplanes which are in perfect condition and which after inspection by the highest British aeronautic authorities, are considered perfect and are given a certificate of air worthiness which means that the British Government stands behind them. The remainder, which are not in perfect condition will be destroyed and the metals and materials of which they were made will be sold at junk value.

"The transcontinental aerial transportation lines are to be established and in operation by July and arrangements have been made with leading commercial interests since the asquisition of these aeroplanes, for the transportation of merchandise and the contracts already negotiated show that the volume of merchandise to be transported will assure these aeroplanes leaving daily, on schedule time, with a full load.

"On this account, it will not be possible to start carrying passengers this year and we are glad of it, because for passenger carrying, we want to get the best aeroplanes that AMERICAN ENGINEERS AND AMERICAN CONSTRUCTORS CAN PRODUCE. Bids will be invited in the near future from all American aircraft manufacturers for a large number of aeroplanes, especially adapted for the transportation of passengers, and every inducement will be given to American manufacturers to supply us with aerial Pullman cars for the passenger carrying service."



THE NEWS OF THE WEEK

Orville Wright Awarded John Fritz Medal

A large attendence was present at the occasion of the presentation of the John Fritz Medal to Orville Wright held recently in the auditorium of the Engineering Societies Building, New York City. The presentation was made by the John Fritz Medal Board of Award.

Aeroplane Carrying Four Ascends 17,100 Feet

El Centro, Cal.—Capt. Lowell H. Smith, commanding officer of Puryear field here, has broken what is said to be the world's altitude record for an aeroplane carrying a pilot and three passengers today, when he ascended 17,100 feet. The aeroplane was in the air two hours and forty minutes. Capt. Smith carried three corporals as passengers.

Flies from Boston to Auburn, Maine

A cross-country flight from Boston to Auburn, Maine, was recently made by Lieut. Parker B. Sturgis in a Curtiss JN4D aeroplane. Lt. Sturgis encountered three thunder storms on the trip, making the flight a rather bumpy one.

The plane belonged to the Airplane Company of the North-East, which does commercial flying and aerial transportation work, in addition to operating the flying school at Auburn.

British Air Attache Flies at Hawaii

Air Commodore L. E. O. Charlton, British Air Attache at Washington recently paid Luke Field, Ford Island, Hawaii, a visit. After a tour of the Field, Colonel Curry, Department Air Service Officer, with Major Brooks took the Commodore around the Island of Oahu in an HS2L flying boat.

Flight from Toronto, Canada, to Akron, Ohio

The first aeroplane of the National Airway Service Company, was flown recently from Toronto, Canada, to the company's aerodrome, Wright Field, near Akron, Ohio, by pilots J. G. Layton and L. F. Ross. This machine has been put into operation for passenger-carrying, advertising, aerial photography and instruction work.

The National Airway Service Company will maintain aerial service at Wright Field, Fairlawn, for the Akron Flying Club, which has a five years' lease on the field. The aerodrome is rapidly being put into shape and will be soon be prepared to offer complete service to transient pilots.

The officers of the company are: I. S. Myers, president; John R. Gammeter, vice-president; L. F. Ross, secretary; E. L. Howe, treasurer, and J. W. Kunneke, general manager.

Form Aerial Taxicab Companies in Canada

Montreal—Seventeen aerial taxicab companies are being formed in Western Canada, and a number of these have already been licensed by the Air Board. Four commercial flying companies have been formed in Winnipeg, one will be floated in Brandon and an aerodrome is to be built in Virden. There is a company at Regina, another in Moose Jaw, two in Saskatoon, two in Edmonton, one in Hanna, Alta.; one in Calgary, one in Lethbridge, one in Banff and two in Vancouver.

President's Bill Would Govern Aerial Navigation

Washington—Creation of a commission, composed of representatives of various government departments, to regulate aerial navigation in this country, is proposed in a bill introduced by Chairman Kahn of the House Military Committee at the request of Secretary Baker. The request was made at the direction of President Wilson. The bill is designed to obtain uniform regulation of aircraft throughout the United States.

The commission, under the bill, would have the authority to draft regulations for operation of all aircraft, commercial or military and issue licenses to operators and owners, which might be held only by American citizens or American owned

Lieutenant Cortinez in a Bristol Monoplane at Santiago, Chile, Starting On a Flight Over the Andes

corporations. Regulations of the commission, however, would not become operative until approved by the Secretary of Commerce.

The personnel of the commission would be limited to one representative from the departments of State, Treasury, Commerce, War, Postoffice, Navy and Agriculture and the National Advisory Committee for Aeronautics. Selection would be made by the President.

Absolute Fireproof Aeroplanes

One of the most cardinal problems in increasing safety in flying will be shown to have been solved on May 25th, at Atlantic City, as the result of the demonstration for the benefit of Government officials and aeronautical experts of an invention which will decrease the casualties in flying 100%—an absolutely fireproof and heatproof aeroplane which will be tested by being set afire with an electric atachment.

The machine has been fireproofed by Parker R. Bradley's process using a dope or paint. Mr. Bradley, who has had a very successful career as an inventor and chemist, has also invented a fireproof and heatproof flying suit and helmet.

So enthusiastic are the pilots over the latest thing in the Aeronautical World that they have refused to carry parachutes or use a special flying suit.

The pilots who will be in the machine are Hugh Gordon Campbell and Charles Wayne Kerwood, the latter Chief Pilot for the Corporation. Both men are well known in aeronautics both here and abroad. They served with unusual honors as members of the famous Lafayette Squadron of the French Army.

The machine used will be an American built Curtiss for which Parker D. Cramer, a former Army and Navy pilot has been superintendent of the fireproofing and as aeronautical engineer for the Aircraft Fireproofing Corporation who have been financing the proposition, with Captain J. G. Hope, formerly of the British High Commission and the Royal Flying Corps in charge.

AERIAL EXPRESS COMPANY ANNOUNCES GIGANTIC PROGRAM OF SEAPLANE LINES

Another announcement which made the Congress an epochal event both in the history of aeronautics and of transportation was the announcement of the plans of the Aerial Express Company, of Detroit, which bought a large number of twin motored F. & L. seaplanes from the Navy Department, with which to establish aerial transport lines with thirty seaplanes on the Great Lakes and Atlantic and Pacific coasts.

Mr. Thomas F. Dunn, the president of the company, made the announcement through the Aerial League of America of the plans which had been withheld from the public pending the delivery of the first six seaplanes by the Navy Department, which are being converted to give maximum comfort for passenger-carrying service.

The U. S. Aerial Express Company is engaged in the business of transportation between cities, carrying passengers, freight, mail, express or any other commodity that is profitable.

It also does such additional things as advertising, photography, mapping.

It is already to act as agent or distributor for aeroplane manufacturers, importers, makers of aeroplane parts, aircraft insurance houses, etc.

The first project is the establishment of an aerial transportation line between Cleveland, Buffalo, Toronto and Detroit.

Assignments of seaplanes for aerial transportation have been made covering territory of Great Lakes, Mississippi River, Gulf States, Pacific Coast to Alaska and the Hawaiian Islands.

They use U. S. Navy type flying boats of 800 h.p. with a capacity of 5,000 pounds, or twelve to fifteen passengers, a crew of two, and about 1,000 pounds of mail, express and luggage.

Smaller flying boats and land planes will be used to carry on work where the large planes cannot be profitably employed.

This company is composed of progressive business men of Detroit, Cleveland and Buffalo.

The average time between Detroit and Cleveland by seaplane is seventy-five minutes, saving about six hours on the fastest time possible by rail. Between Buffalo and Detroit is about three hours or less. It will allow a business man to go to Cleveland and return before noon if he starts from here in the morning. It will save from ten to twenty-four hours on delivery of mail from the East to business concerns in this vicinity. Night trips carrying special freight, mail and express to and from the East will be in demand.

AEROPLANES AND MOTORS EXHIBITED AT ATLANTIC CITY

The aeroplanes and motors exhibited and demonstrated covered twenty thousand feet on the Steel Pier and filled the hangars at the Airport and the Curtiss Seaplane Station at the Inlet.

The Aerial Transport Corporation, the inspiring organization which is establishing aerial transportation lines throughout the United States and the Aircraft Sales Corporation, the organization which took over the surplus aeroplanes and motors from the British Government and will sell to manufacturers and aviators several thousand motors and aeroplanes which are not needed for the transportation lines, made an extensive exhibit, including the following aeroplanes and motors shown for the first time in the United States: a Norman-Thompson flying boat, a Martinsyde biplane, a DeHaviland No. 9, a Sopwith Snipe and a twin motored Handley Page.

Also the following motors: B. E. 2 type, Sunbeam-Puma type, Rolls-Royce Eagle, Rolls-Royce Hawk types, Wolseley-Viper type, B. R. 2 type, Cosmos-Dragonfly type, a Fiat 300 h.p., a 80 h.p. Le Rhone and a 300 h.p. Hispano-Suiza.

Other exhibits include the twin seater S. V. A. and the Palilla biplanes also shown in this country for the first time and the sensational all metal J. M. L. monoplane which will be described in our next issue.

The AIRCRAFT TRADE REVIEW

"Orenco" to Expand

The recent performance tests, with the Model F four-passenger "Tourister," conducted by C. B. Coombs, former Chief Test Pilot of the Government Testing Station, McCook Field, Dayton, Ohio, have met with such spontaneous approval of engineers and pilots throughout the country, that the Ordnance Engineering Corporation, builders of the ship are enlarging their facilities to go into immediate production—the first order calling for 25 "Touristers" Models. Early deliveries can be assured commencing June 1, 1920.

The forthcoming models will be equipped with the 200 H. P. Hallscott "Liberty Six" motor. This motor has met with the highest approval of the U. S. Army Air Service, and the U. S. Aerial Mail Service. The additional power will be of especial advantage in mountain flying and in improving the already exceptional quick take-off.

Additional improvements which will have a strong commercial appeal will be arranged for in the new Models. The front and rear cockpits will be enlarged to permit more freedom to the passengers; a door to the front cockpit will allow easier access to passengers and a mahogany veneer fuselage will add greatly to the attractiveness of the machine.

Aircraft Insurance in Canada

The Travelers Insurance Company has joined the companies which are writing personal liability and property damage insurance on aircraft in Canada. A particularly interesting feature of the policy is an endorsement specifically stating that the company does not cover any machine while it is engaged in smuggling liquor across the Canadian border.

In this connection it will be recalled that the Home Insurance Company of New York started binding Canadian aircraft risks two months ago.

New Ohio Company

The Aero Club of Mansfield, Ohio, has been incorporated and will shortly engage in the business of passenger carrying and instruction of aviation pupils. The officers of the company are as follows: F. W. Beach, President; L. C. Chase, 1st. Vice-President; Mrs. G. A. Farrow, 2nd Vice-President; J. C. Ditwiler, Secretary, and E. R. Hartman, Treasurer.

Cincinnati Aerial Terminal Opened

Cincinnati.—The big aerial terminal of the Cincinnati Aircraft Company, at Duck Creek Road and Deerfield Pike was formally opened and dedicated by the Chamber of Commerce Aviation Committee on May 19th. Major R. W. Schroeder, of McCook Field, Dayton, O., officiated.

President Charles E. Lay, of the Cincinnati Aircraft Company, was for many months the only aeronautical enthusiast in the city, and it is due entirely to his patient, untiring work that the big field has been established.

Plans Building for Aviation Offices

R. C. (Cliff) Durant, Los Angeles, Cal., is planning a fifteen story building for a downtown location in Oakland, Cal. to be devoted almost entirely to aviation activities, and the erection of an aeroplane factory and assembling plant near Oakland.

The new building will be known as the "Aerial building." The first two floors will be used for display rooms for the Dayton-Wright aeroplanes and the aeroplanes of other concerns that Durant will represent on this coast.

Durant's aerial program includes the manufacturing of the Durant Aircraft aeroplanes at the new plant.

Left to right: Capt. O. F. Holden, C. E. Merrill, Clarence C. Coombs, pilot, and Howard Mingos, in front of the Orenco "Tourister," in which they reached 16,200 feet in one hour recently at Mitchell Field, Long Island

Spokane Aviation Co. Has Complete Equipment for Aerial Work

Spokane, Wash.—With its four-plane hangar finished and the Parkwater field cleared of stones and leveled off, the Spokane Aviation company has complete equipment for flying work.

Commercial passenger carrying, a school of instruction and other lines of flying work will be done. The Parkwater field has been cleared up, giving a fine four-way field, with an east to west take-off a mile and a half long.

Insurance Covers Aerial Limousine

A Curtiss-Eagle aerial limousine, valued at $40,000, was insured under a $22,500 aircraft policy covering fire, theft and collision by the Fireman's Fund. The plane is to be used in passenger carrying service between San Francisco and Los Angeles and will be operated under the management of the California Aerial Transport Company.

Lincoln-Standard Planes for U. S. Aircraft Corp.

Spokane, Wash.—Five Lincoln-Standard aeroplanes, purchased by the United States Aircraft corporation have been delivered in Spokane, and the work of setting them up is under way. C. H. Messer is manager of the corporation. Two of the planes have been used by the company for training purposes in the east, while three are new. The company has the agency in this district for the Lincoln-Standard planes.

Gulf States Aircraft Company Active

Much aerial activity has been carried on in the south by the Gulf States Aircraft Company of Shreveport, La., during the last few months. This company is operating a commercial flying service for passenger carrying, express and package delivery, advertising and exhibition work. Five new aeroplanes have been ordered for passenger and freight service from Shreveport to points in Texas, Arkansas and Louisiana. Branch flying stations will be established at Alexandria, Lake Charles and New Orleans, La.

Lieut. Henry Toncray, chief pilot of the company recently distributed from the air, food supplies, medicines, first aid articles, to the people of the town of Eras, La., which was made destitute by a hurricane. This quick service to the stricken town was of great assistance in relieving the situation.

The officers of the Gulf States Aircraft company are: J. T. Tanner, president; Lt. Henry Toncray, vice-president; S. R. Elliott, secretary-treasurer, and the board of directors consists of W. R. Hirsch, J. C. Foster, W. H. Morefield, and E. R. Jones.

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, Assistant to the Second Assistant Postmaster General in Charge of Aeronautics
S. Murray Moore, Jr., Chief of Maintenance and Equipment

J. Clark Edgerton, Chief of Flying
John A. Jordan, Chief of Construction
George L. Conner, Chief Clerk, Aerial Mail Service
John A. Willoughby, Operator in Charge Radio Experiments
Eugene Sibley, Operator in Charge Radio Maintenance and Operation

Eugene J. Scanlon, Chief of Supplies

US
AERIAL MAIL

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Paul S. Oakes
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt

Charles I. Stanton, Superintendent New York-Washington Division
Walter H. Riddell, Superintendent, New York-Chicago Division
William J. McCandless, Superintendent, Chicago-Omaha Division
Samuel F. Doane, Manager, Heller Field, Newark, N. J.
William H. Read, Manager, Bustleton, Pa.
Duard B. Colyer, Manager, College Park, Md.
Andrew R. Dunphy, Manager, Chicago, Ill.
Maurice J. Kelly, Manager, Bellefonte, Pa.
William I. Votaw, Manager, Omaha, Nebraska
Victor W. Fitch, Manager, Newark Warehouse

PILOTS

Frederick A. Robinson
Walter J. Smith
Paul W. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris
Mark C. Hogue
Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen

Two Years of the Aerial Mail

The Aerial Mail service has been operated with phenomenal success during two years, the second anniversary of its inauguration being May 15. The routes in operation at the close of the second year extend from Washington to New York, from New York to Chicago, and from Chicago to Omaha.

Within a few weeks the service will be extended to St. Louis. A survey and inspection of the proposed route through to San Francisco is now being made, and service through from New York to the Pacific Coast will be inaugurated as soon after the beginning of the fiscal year as the necessary equipment and landing fields can be perfected.

It has been anticipated that the route between Washington and New York would have to be abolished in consequence of Congressional action in providing for the Aerial Mail service. This, however, will not be the case. The New York-Washington service will be continued along with the establishment and operation of the New York-San Francisco service.

The manner in which the problems involved in the utilization of aeroplanes for carrying mail have been solved and the complete efficiency developed in the operation of the Aerial Mail service has put an end to skepticism as to the practicability of aerial transportation and greatly advanced the commercial utility of aviation.

When the Aerial Mail service was established May 15, 1918, there was a division of opinion among authorities in aeronautics as to whether flying would be possible under adverse weather conditions. The Post Office Department has demonstrated by its daily service that the mail can be carried by aeroplane under all weather conditions, winter and summer.

During the second year the postal aeroplanes covered a total mileage of 498,664, transporting a total of 538,734 pounds of mail. The average percentage of performance, including flights made under the most adverse conditions, was 87% for the entire year.

The New York-Washington route operated daily with an efficiency of better than 90 per cent. Its success justifies the extension of the service from New York across the Allegheny mountains to Cleveland and Chicago, and the success of that undertaking resulted in Congress authorizing a daily round trip Aerial Mail service during the coming fiscal year across the continent from New York to San Francisco.

During the past winter, which has been the most severe in some time, the Aerial Mail operated successfully, advancing the mail practically all of the time from 12 to 16 hours over the train time, had the trains arrived on schedule time. However, the train schedules between New York and Chicago were notoriously bad during the past winter months.

Economically, the Aerial Mail has been justified as signally as it has been justified as a flying proposition. Not only has the cost of operations kept down far below what the original friends and supporters of the Aerial Mail had anticipated but, by reason of the operation of the service between Washington and New York, there has been a saving to the Government at the rate of $42,500 a year and a saving between New York and Chicago at a rate of more than $100,000 a year. That means that in carrying first-class mail matter which requires distribution on the trains the Aerial Mail operates more cheaply than do the distributing cars on trains, wherever there is a large quantity of mail to dispatch.

Of all of the complex transportation problems the matter of mail transportation is the most complicated. In the case of the Aerial Mail, for instance, the route from New York to Washington is not for the purpose of advancing mail over train service from New York City to the city of Washington but to insure the delivery of New England mail in the city of Washington in the afternoon instead of the following morning if it had come by train. This mail reached New York early in the morning by the night trains from New England and in two and a half hours flying time is set down in Washington. The result is that it is all delivered by the afternoon carriers. Flying from Washington to New York, however, there is a great gain in the receipt of letters in New York City from the entire South. Mail worked to carriers on trains, is taken from the trains in Washington and delivered in New York City early that afternoon. Had the mail continued to New York by train it would not have reached there until after all carrier deliveries had ended and the letters would have been delivered the following day.

In the movement of mail by aeroplane from New York to Chicago, the mail that is taken out of New York early in the morning for Chicago is not for the patrons of the Chicago office but for the States of the West and the Middle West. This mail is taken off the plane at Cleveland and placed on board a train bound for Chicago which insures catching earlier connections at Chicago for the West and Middle West. Such mail is almost invariably advanced 16 hours to the persons addressed. At Cleveland the mail is taken off the train which left New York City at 5.30 o'clock the afternoon before and which train would have reached Chicago too late for carrier deliveries, and is carried by aeroplane into Chicago in time to catch all of the carrier deliveries that afternoon in that city. The result is that the mail is delivered to the people of Chicago on the afternoon instead of the following morning. By this arrangement 800 pounds of mail a day, or more than 30,000 letters, are expedited about 16 hours in deliveries to the patrons; whereas if only Chicago city mail had been taken out of New York only 400 pounds of mail could have been expedited. It means an expedition of 30,000 letters 16 hours, rather than the expedition of 15,000 letters from 20 to 24 hours.

Until the transcontinental route is established and service actually begins from New York to San Francisco, the Chicago-Omaha route will be merely for the purpose of expediting the mail between Chicago and Omaha. When the New York-Frisco route starts, however, the Aerial Mail, which will leave New York at daybreak, will be in Omaha that same day before sunset. Mail leaving New York Monday morning will arrive in San Francisco by 9 o'clock Wednesday morning. The best schedule that can be made by train would be taking mail leaving New York at 8:40 p.m. and delivering it in San Francisco at 12:30 p.m. on the fourth day. The Railway Mail Service can accomplish this only if they make the transcontinental connection at Chicago, and this connection is missed whenever the train is as much as an hour late. On the average, the train leaving New York at 8:40 p.m. misses this connection 40 per cent of the time and the mail takes 24 hours

Continued on page 380)

THE RAUSIE 175 H. P. AERO ENGINE

THE Rausie Engine is a six-cylinder, vertical, four cycle, water cooled with valves in head operated by an overhead camshaft.

The cylinders are made from nickel steel with the head and combustion chamber screwed on to barrel and welded. The outside of cylinder, one and one-half inches from top, are threaded outside so the aluminum jacket can be screwed on; at the bottom of this thread is a shoulder holding a copper asbestos gasket. When the aluminum jacket is in place, this gasket makes a water tight joint, keeping any water from leaking through. At the bottom of jacket a tight joint is made from a special rubber ring held in a groove in cylinder barrel; this allows jacket to expand freely without any strains.

The water inlet to cylinder jackets are cast integral and connected in series by a special rubber ring clamped in place by a wire hose clamp. The water outlet at top of jacket is collected by a water pipe, connected at each cylinder by a hose joint. Each cylinder has two valves; each valve has two springs, one having a right hand coil, the other left hand. Circulation of water around valve ports has been well provided for by the location of the out going water, thus a perfect circulation is formed. Cylinders are held on to crank case by ten ⅜" studs. In designing the valve operating mechanism every effort has been made to do away with the number of small parts, such as rockers, rollers, pins, bearings, bolts and nuts. In the Rausie design there is only one moving part at each valve; this being a plunger weighing five ounces. The plungers fit into the aluminum camshaft housing held in place by a key. They are machined on cam end with a radius. When the cam housing is taken off of the engine it takes with it the camshaft plunger, leaving nothing but the valves and springs. Every effort has been made to simplify the design and to make it accessible. By taking off twelve nuts the complete valve operating device can be free from the engine. The upper crank case holds seven bearings for the camshaft; the bearing bolts go clear through the case to cylinder base. The case has large openings through each section above main bearings to allow a free passage of the heat to the breathers. The pistons are made from aluminum alloy with a very heavy wall at the ring grooves, each piston has three rings (concentric) above piston pin, wrist pin turns freely in piston bosses.

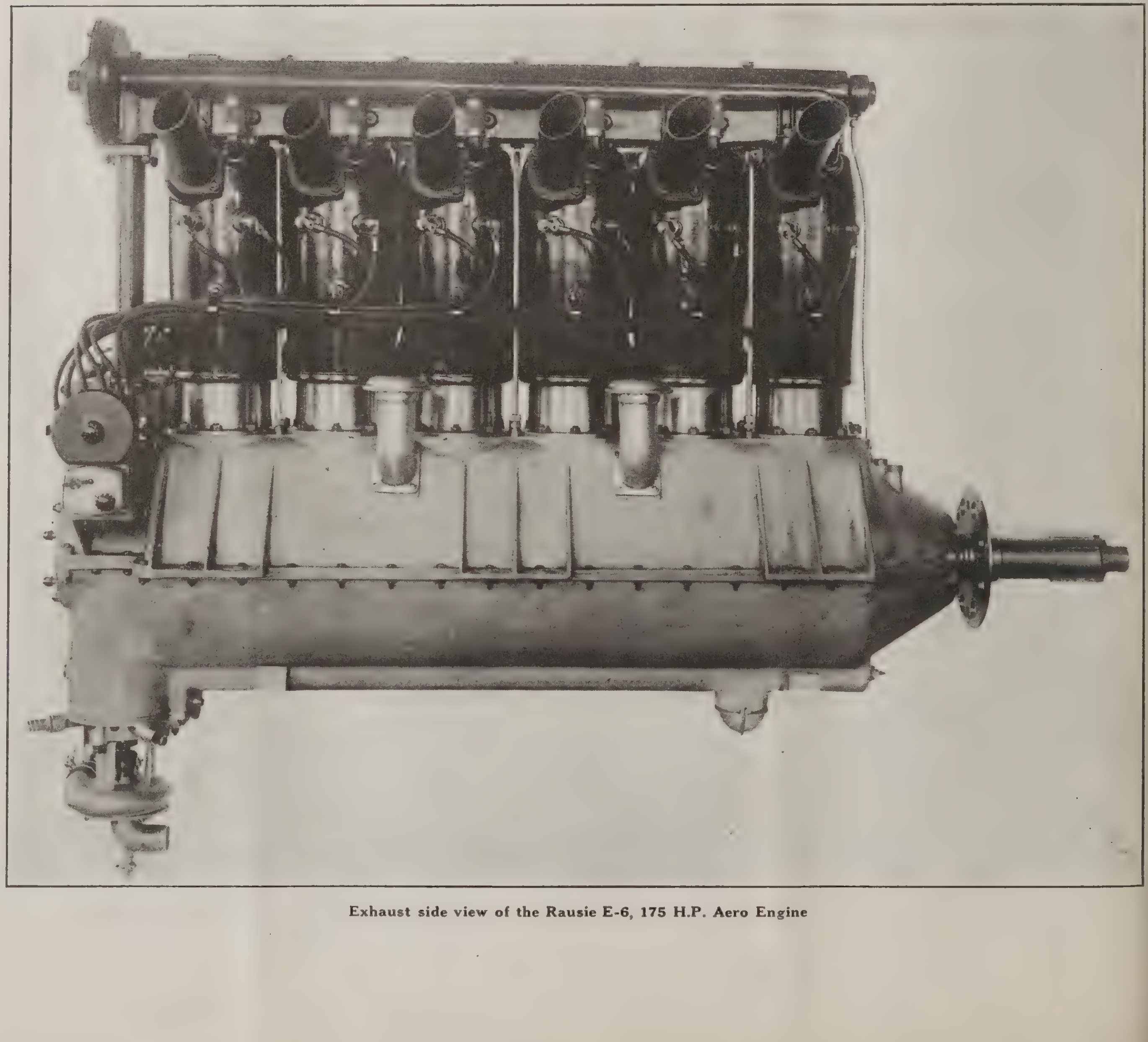
Connecting Rods are of the "I" Section, machined all over, the wrist pin is held by a clamping bolt, the large end has two bolts and two solid brass shims to hold cap and bearing in place.

Camshaft is machined all over, hollow throughout the entire length to allow oil to be fed through all of the bearings. All main bearings are babbit lined, the thrust being an "S.K.F." bearing of two directions. The crankcase base carries the oil pump, water pump and oil lines. The base can be taken off without disconnecting any piping, leaving bearing free to be inspected.

The propeller hub is of the United States standard except the differential nut, which is made in two separate nuts, one is a spanner nut while a tommie bar is used on the other. The hub fits on a taper 1.10.

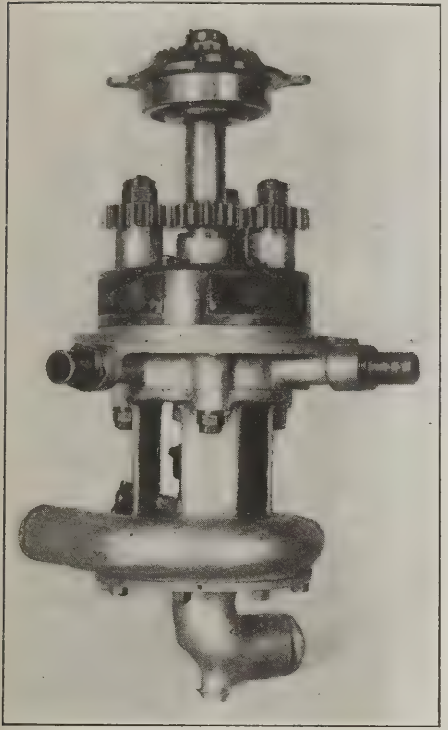
Ignition, two Dixie Magnetos, Type 600. Both magnetos run clock wise and have adjusting flanges for accurate timing.

The cam shaft, magnetos, oil pumps and water pumps are driven by vertical shafts running on self-aligning ball bearings. The main driving gear drives two gears on vertical shafts, the ratio is one to one and one-half, the vertical shafts run at one and one-half engine speed; this makes a one to one ratio at mag-



Exhaust side view of the Rausie E-6, 175 H.P. Aero Engine netos, three to one at cam shaft drive, and one and one-half engine speed for water pump. The water pump and oil pump is built into one unit; the oil pumps are three complete pumps of the gear type.

The oil is pumped throughout the entire engine by one pump and returned to the supply tank by the other two, one pumping from either end of sump. The oil reserve is carried in an outside tank as the oil is pumped to and from it, it is filtered and cooled.



Combined unit consisting of oil pumps and the water pump

The engine is designed to take either electric or air starter. The front end of crank case being more or less standard will take most any standard equipment. Every effort has been made in the Rausie engine to be economical in fuel consumption and for every part to be operated under exact timing with each other. The timing of the engine firing under 1-4-2-6-3-5. The intake opens ten degrees late and closes forty degrees late. The exhaust opens forty-eight degrees early and closes fifteen degrees late. The weight of the motor complete is 510 pounds. Compression ratio—5.5—rated horse power at 1650 R.P.M. is 175 HP. Mean effective pressure 119. Displacement 707 cubic inches.

The Cylinders

Are made from nickel steel and are fitted with aluminum jackets which screw down over the combustion chamber; to prevent any water leaks, a copper asbestos gasket is placed at lower end of aluminum head. The cylinders are held on case by ten ⅜″ studs.

Valves

Are made from stainless steel, two per cylinder. Each valve has two springs, one right hand coil, other left hand.

Pistons

Are made from "Lynite" sections; are very heavy, to hold its shape; also keeps ring from sticking in grooves from carbon. There are three hammered concentric rings used.

Connecting Rods

Are made from nickel steel of the I section; the large end is fitted with a babbit bearing, while the small end clamps the gudgeon pin.

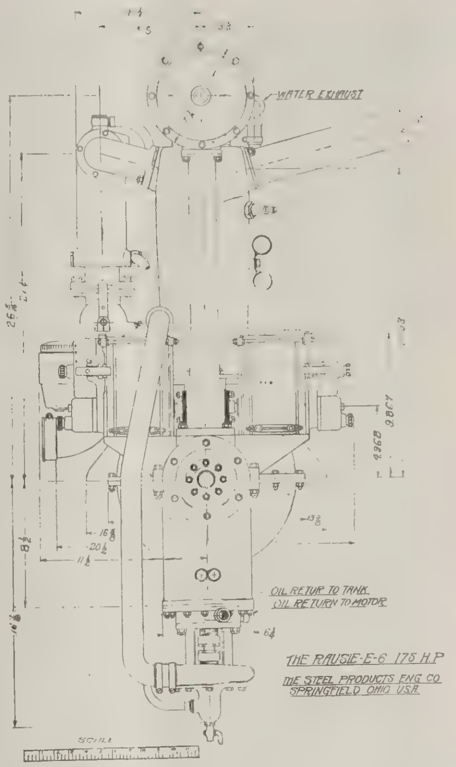
General Data

Number and arrangement of cylinders —Vertical	6
Bore	5″
Stroke	6″
Stroke-bore ratio	1.2
Area of one piston	19.635 sq. in.
Total area	117.81 sq. in.
Swept volume of one cylinder	117.81 cu. in.
Displacement of motor	707. cu. in.
Compression ratio	5.5
Normal brake H.P.	175 @ 1650 R.P.M.
Type valve gear	overhead cam shaft—no rocker arms
Number of carburetors—Miller	2

Valves

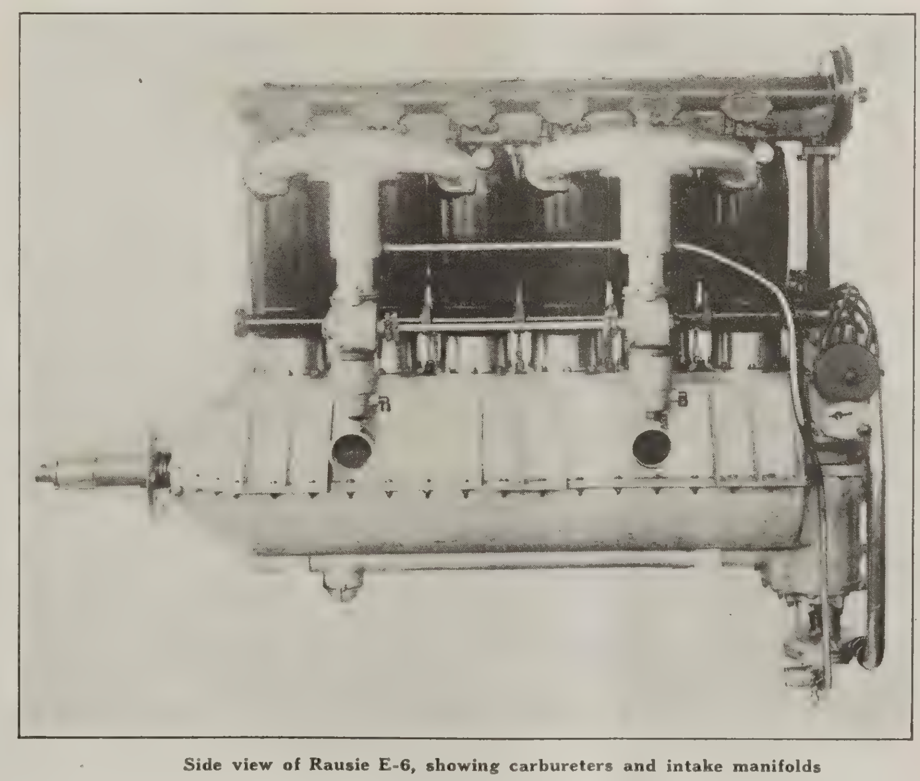
Number per cylinder	One inlet and one exhaust
Outside diameter	2-7/16″
Port diameter	2-5/16″
Width of seat	⅛″
Valve lift (inlet)	.5″
Valve lift (exhaust)	.5″
Diameter valve stem	7/16″
Length of valve	5.78″
Number of springs per valve	2
Length of spring in position	2-13/32″
Mean diameter of coils (large)	1-17/32″
Mean diameter of coils (small)	1-3/16″
Inlet plunger clearance	.020″
Exhaust plunger clearance	.020″
Position of valves	Vertical

Cylinders



Line drawing, end view of Rausie E-6

Overall height of cylinders	16-1/16″
Length of projection in case	⅛″
Diameter of cylinder over water-jacket, max	6-⅝″
Diameter of cylinder over water-jacket, min	6.48″
Thickness of flange (base)	¼″
Number of studs	10.
Diameter of studs	⅜″
Thickness of water-jacket	5/32″
Thickness of cylinder head	¼″
Thickness of combustion chamber wall	3/16″
Thickness of cylinder barrel	⅛″ & 5/32″
Number of reinforcing ribs	4.
Thickness of valve port	3/16″



Side view of Rausie E-6, showing carbureters and intake manifolds

Diameter of port at valve	2-5/16″
Diameter of port at flange	2-⅛″
Number of spark plugs	2.

Pistons

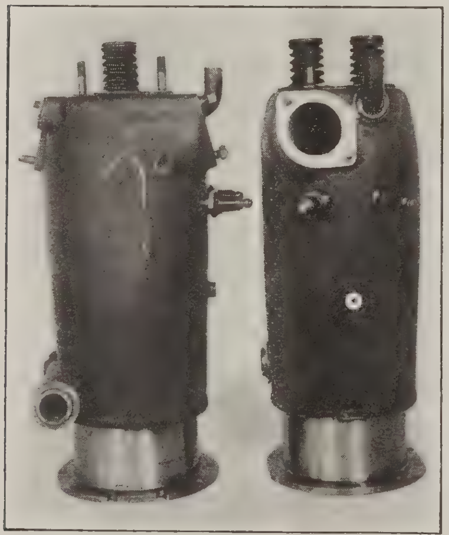
Type of piston	Crowned
Material	Aluminum
Length of piston	4-13/16″
Length of diameter ratio	.96 plus .01
Number of rings per piston	3
Position of rings	Above gudgen pin
Width of rings	3/16″
Width of lands	⅛″
Distance from bottom to center of gudgeon pin	2″
Thickness of head	⅜″
Thickness of wall at bottom	3/16″
Diameter of gudgeon pin	1¼″
Thickness of gudgeon pin wall	⅛″ Taper 3° Thicker

Connecting Rod

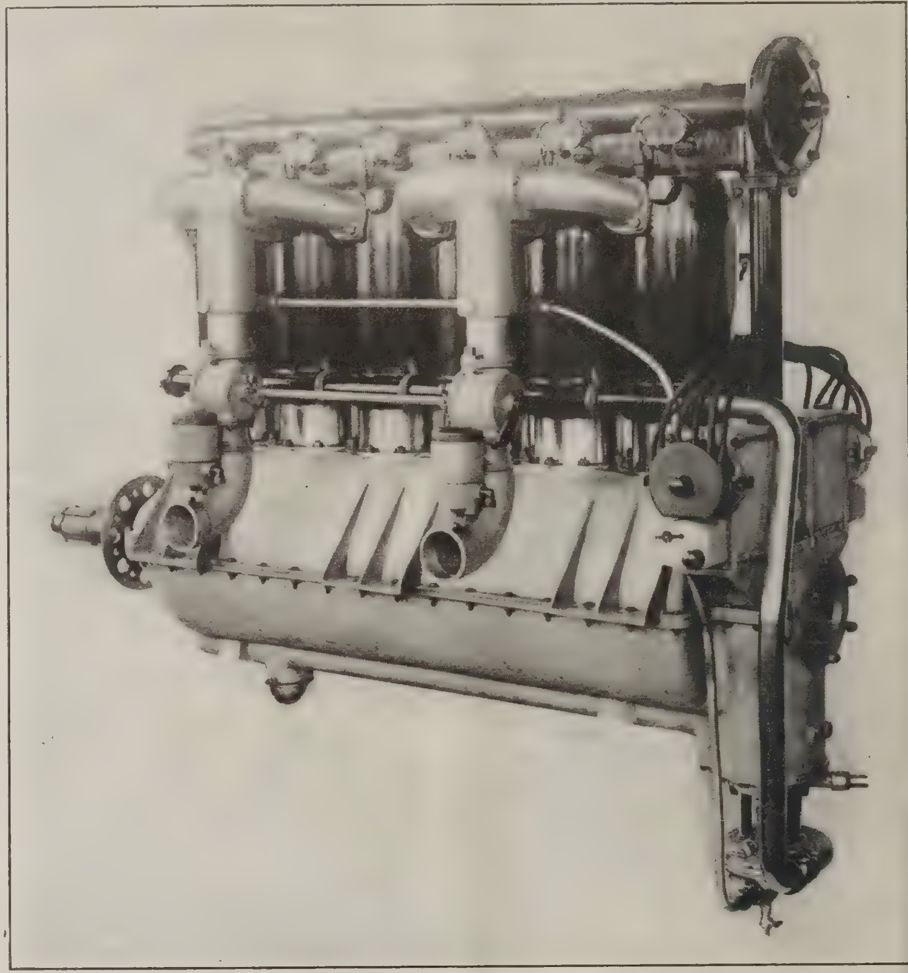
Type of section	I
Length between centers	11-¾″
Small end bearing	In piston
Length of small end of rod	1-⅞″
Outside diameter	1-⅝″
Depth of I section	1-⅜″
Width of web	⅞″
Thickness of flange	3/32″
Large end bearing	Parsons-White-Brass
Inside diameter	2-⅛″
Outside diameter	2-7/16″
Length	2-⅜″
Thickness of babbit	5/32″

Crank Shaft

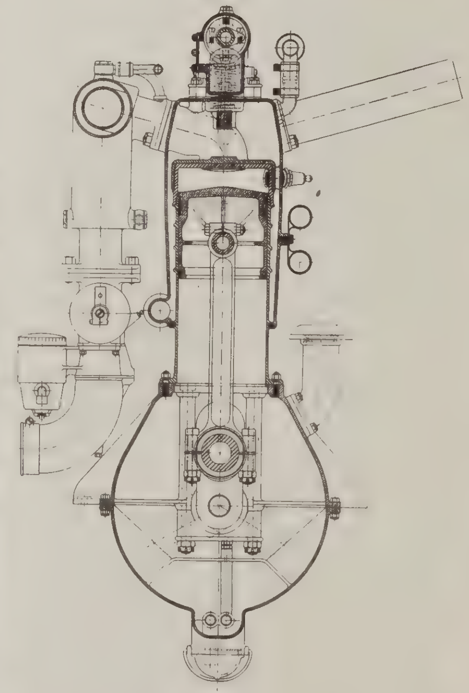
Number of bearings	7
Cylinder centers	6.5″
Crank Pins—	
Outside diameter	2-⅛″
Inside diameter	1-¼″
Length diameter	2-⅜″
Main Bearings—	
Outside diameter	2-⅛″
Inside diameter	1-¼″
Length	2-⅜″
Length propeller end	4″
Crank Webs—	
Width	2-⅝″
Thickness	⅞″
Radius of fillets	⅛″
Weight of shaft	62 lbs.



Cylinder of Rausie E-6 aero engine; left view showing water inlet on lower part of cylinder, right view showing exhaust port and spark plug locations



Three-quarter intake side view, magneto end



Line drawing of internal mechanism, end view

Cam Shaft

Diameter of shaft	1″
Inside diameter	⅝″
Number of bearings	7
Length of bearings (5 intermediate)	2-¼″
Length of bearing (gear end)	3″
Length of bearing (front end)	2″
Width of cam face	⅝″
Number of cams per cylinder	2
Diameter of gear flange	2-⅝″
Thickness of gear flange	3/16″
Diameter of bolt circle	2-⅛″
Number of bolts	7″
Diameter of bolts	¼″
P. D. of gear	6″
Number of teeth	60
Width of face	½″
Cam Shaft Housing—	
Material	Aluminum
P. D. of pinion	2″
Number of teeth	20
Width of face	½″
Diameter of inclined drive shaft	¾″

Crank Shaft

Upper

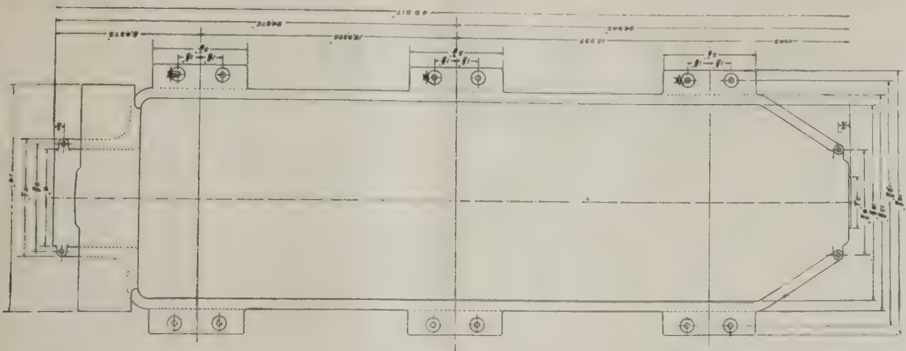
Material	Aluminum
Thickness of wall	3/16″
Thickness cylinder pads	½″
Thickness of supporting flanges	5/16″
Center distance of motor supporting bolts	15-⅜″

Lower Crank Case

Material	Aluminum
Thickness of wall	5/32″

Lubrication

Type	Force feed
Type of pumps	Bear
Number of pumps	3
Ratio of pump speed to crank shaft	1.5



Line drawing, lower half of crankcase

Ignition

Type	2 - Dixie -600
Firing order	1 - 4, 2, 6, 3, 5
Number of plugs per cylinder	2
Type of plug	Mossler or Splitdorf
Ratio of magneto speed to crank shaft	1.5

Crank Shaft

Made from chrome nickel steel, machined all over, hollow throughout, to supply oil to all bearings and for lightness.

Cam Shaft

Made from carbon steel, hollow throughout, to allow oiling at each bearing; each cam has an oil hole drilled on the front side, for oiling the cam and plunger. The shaft is supported by seven bearings, made from aluminum alloy. The shaft being held so rigid, allows no lost motion in accurate valve action.

Upper Crank Case

Made from aluminum and so designed to make it very rigid. The main bearing bolts go clear through case; this takes the strain off the casting between cylinder and crank shaft.

Lower Case

Made from aluminum. The base carries the oiling pumps, water pump. By taking off the base the motor is free for inspection. In removing base, there are no oil pipes to disconnect.

Oil System

The oil system is of the force feed type actuated by three complete oil pumps built into a complete unit. There are two pumps for returning the oil to reservoir and one to force through motor. Each time the oil goes through motor it is filtered and cooled. By this system the motor will lubricate at any angle as well.

Ignition

Two Dixie 600 magnetos are used as standard equipment, giving two sparks in each cylinder.

Starter

A starting motor, either electric or air, can be furnished. The starter goes on anti-propeller end, direct connected.

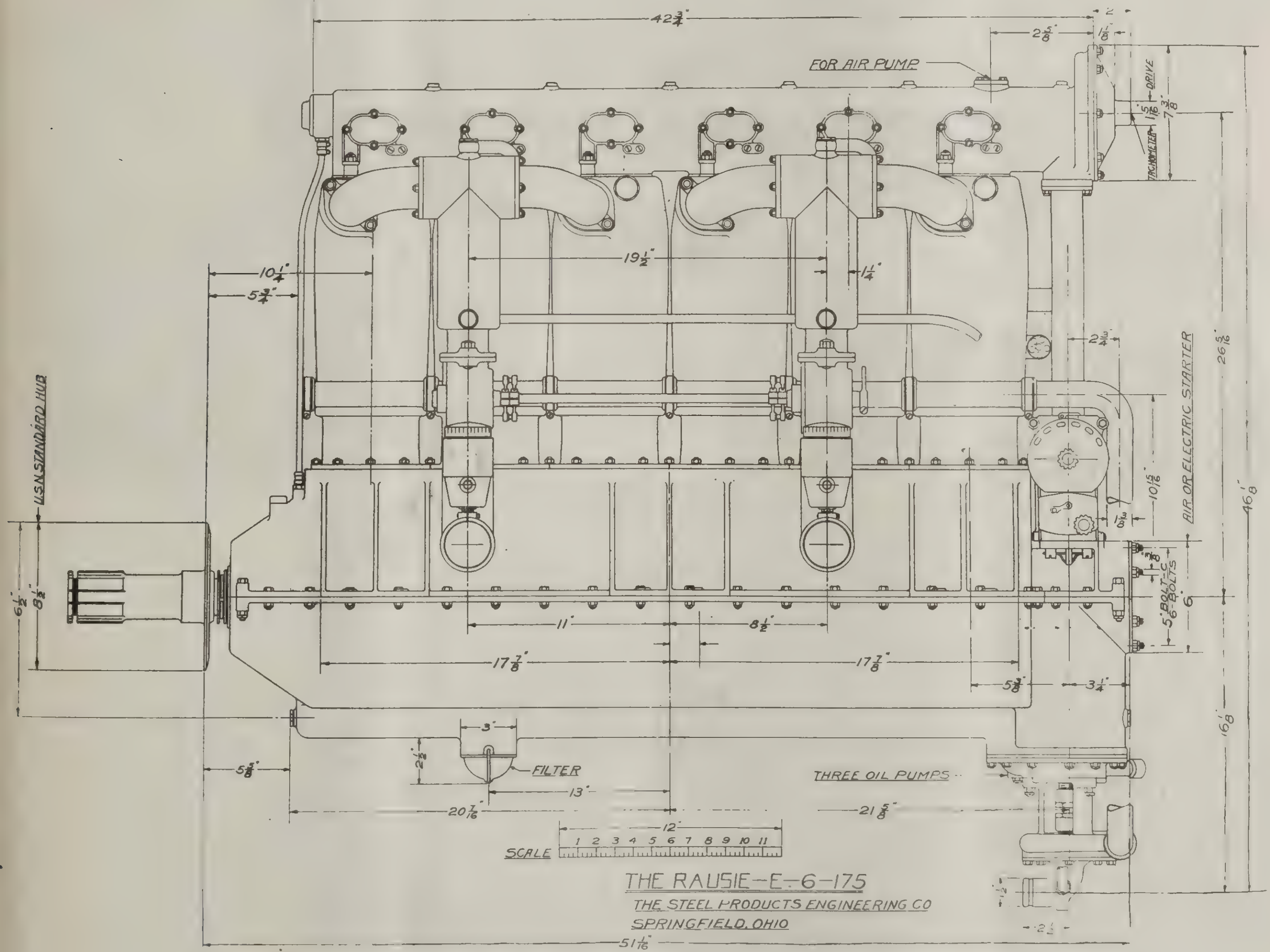
Characteristics

Six cylinders, vertical, bore five inches, stroke six inches for cycle, water cooled, valves in head, direct operated by overhead cam shaft; all enclosed in oil right housing; two Miller carburetors, two Dixie magnetos, self starter (if desired), steel cylinders, aluminum jackets; motor is narrow for good stream line and good fuel consumption.

Weight of motor complete 510 pounds.

Cooling System

Type	Water cooled
Pump	Centrifugal
Diameter of inlet pipe	1-3/8"
Diameter of outlet pipe	1-1/2"
Number of outlets	1
Diameter of rotor	4"
Ratio of speed to crank shaft	1.5



Line drawing, intake-side, Rausie E-6 aero engine

THE GLENN L. MARTIN NEW TYPE NAVY TORPEDO-PLANE

THE Glenn L. Martin Company has just completed another new type of torpedo-plane for the United States Navy. This plane was given its trial test on May 6, 1920 at McCook Field, Dayton, Ohio. Both Army and Navy officials witnessed the trial test and consider the performance of the new Torpedo Plane an unusual success.

The Glenn L. Martin New Type Navy Torpedo Plane has a total gross weight of 11,910 lbs., which includes a useful load of 4950 lbs. In addition to its crew of three men (pilot, navigator, and gunner) this plane carries a 1650 lb.-torpedo, 450 lbs. of bombs, two Lewis machine guns, a radio set, a complete equipment of instruments and accessories, and a supply of fuel for four-hours operation.

It has a flying speed of 107 miles per hour, and will climb from sea level in ten minutes to an altitude of 5100 ft.

Purpose

The Martin Navy torpedo plane is the forerunner of a new phase of naval warfare. Its high speed, comparatively small dimensions and unusual maneuverability give it numerous advantages over the present-day torpedo boat destroyer.

This type of aeroplane is intended for operation either with a fleet or directly from shore stations. Although it is not equipped with floats it has, in addition to its specially designed landing chassis, emergency flotation bags which are inflated by compressed air. Thus it is adapted for landing either on water or on land.

Operation with Fleet

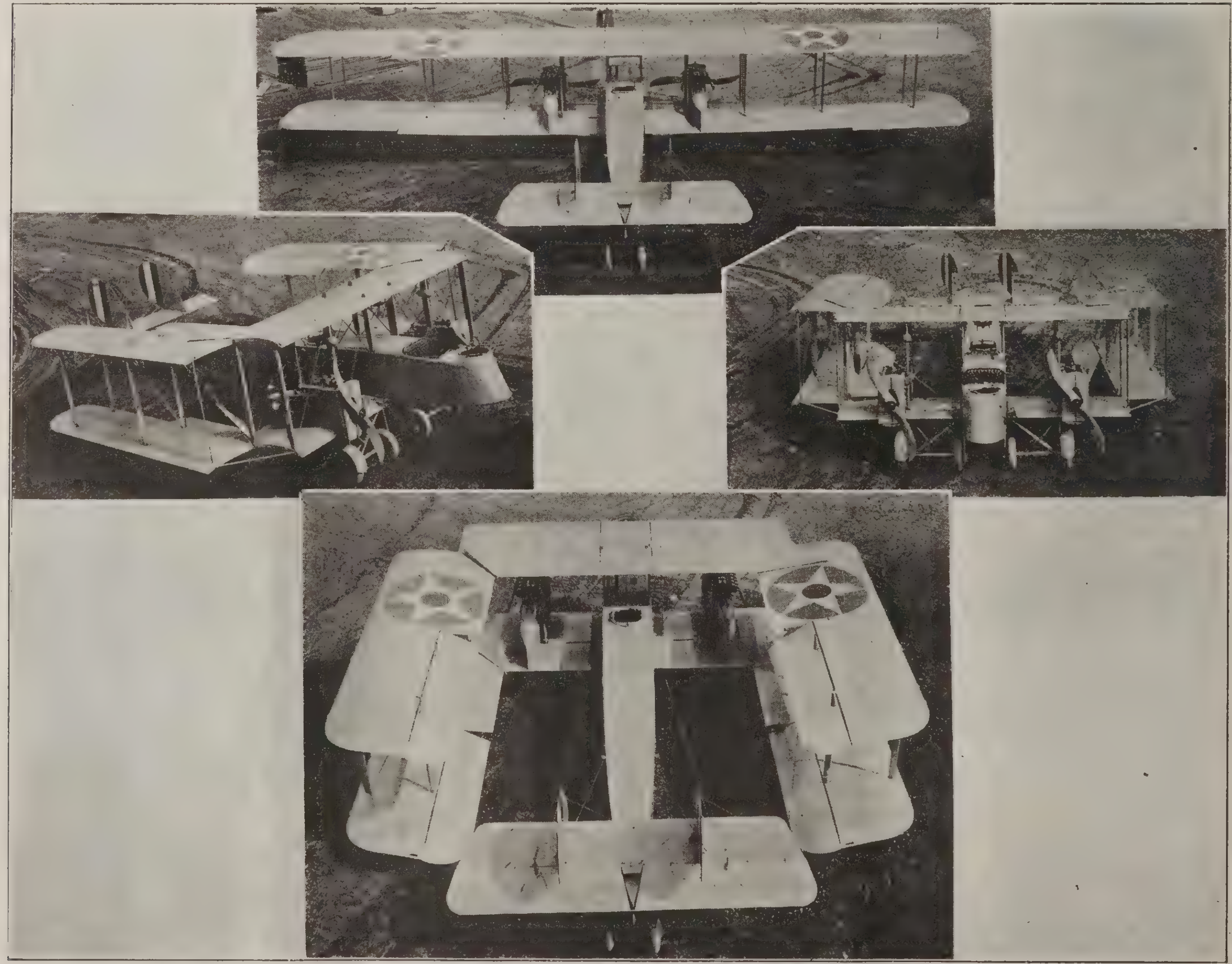
In operating with a fleet, the plane fully loaded can take off from the deck of a warship or sea sled. Its cruising radius of 480 miles permits of several hundred miles reconnaissance, and by means of its radio equipment accurate communication can be maintained at all times. It can single out the enemy, sweep down and launch its torpedo at close range, thus practically insuring a "hit," and then fly back to its mother ship. By means of its flotation bags which are inflated just before landing at sea, it can alight on the lee side of its mother ship and be hoisted on board by means of attachments in the upper wings.

Coast Defense Element

As a coast defense element it can operate from the shore or coast defense station and thus take the place of coast defense guns. The average coast defense gun has a range of about 25 miles, whereas the Martin Navy torpedo-plane can fly out to sea a distance of 200 miles, execute its mission and at the same time keep the home station in constant communication regarding its operations. Should an engagement take place so far out to sea as to make the trip to shore impossible, this plane can land at sea by use of its flotation bags, and signal its home station or any nearby ship as to its location.

Economical Advantage

From an economical consideration twenty Martin Navy torpedo planes can be built for the cost of one torpedo boat destroyer, and can be manned by less than one-third of the men required to operate one torpedo boat destroyer. Therefore the loss of one torpedo plane and its crew of three men is comparatively insignificant in realizing that it is just as capable of sinking a battleship as is a torpedo boat destroyer



The Glenn L. Martin new type Navy Torpedo-Plane. Top view, showing aeroplane from the rear; three other views showing wings folded back which costs twenty times more and requires approximately two hundred men to operate.

In comparison with coast defense guns which cost on an average of several hundred thousand dollars apiece and have a range of about only 25 miles, the Martin Navy torpedo plane can cruise out to sea further than any coast defense gun can fire and probably produce more accurate results due to its reduced range of fire.

Design and Construction

The Martin Navy torpedo plane is essentially a land type, twin-motored, tractor bi-plane, designed to carry a 2100-lb. torpedo (or the equivalent weight in torpedo and bombs), two machine guns complete, radio equipment, a crew of three men (pilot, navigator, and gunner) and sufficient fuel for 480 miles cruising radius.

This new type of torpedo-plane has several recent devolopments, such as folding wings, which when folded reduce the over-all width of the plane to 35 ft. 10 inches—thus minimizing the space required for housing. Another new feature is found in the landing gear which is divided in the middle so as to permit the torpedo cradle, capable of carrying a 2100-lb. torpedo, to be suspended underneath the fuselage.

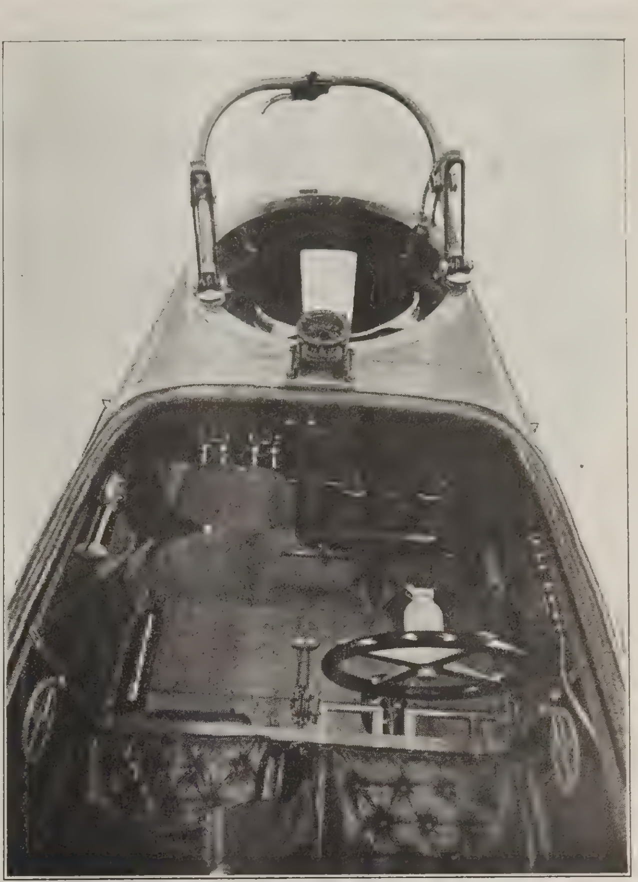
The two 12-cylinder Liberty engines are mounted on the lower front wing beams just outside of the first wing strut away from the fuselage. By mounting the motors in this manner the center of gravity is lowered, the flying efficiency is increased, and the motors are made more accessible than they would be if they were suspended from the upper wings or between the struts.

Specifications

Wing spread, over all	71 ft. 5 in.
Spread, wings folded	35 ft. 10 in.
Length, over all	46 ft. 4 in.
Height, over all	14 ft. 0 in.
Weight, empty	6533 lbs.
Load, useful	4954 lbs.
Weight, gross	11,487 lbs.
Crew	4 men
Factor of safety	5 to 7
Maximum speed	107 m.p.h.
Economical speed (at sea level)	95 m.p.h.
Landing speed	60 m.p.h.
Climbing speed (from sea level in 10 minutes)	5,100 ft.
Cruising radius	480 m.p.h.
Service ceiling	12,000 ft.
Absolute ceiling	10,000 ft.

Motors

Two 12-cylinder Liberty motors, each 400 h.p., rated at 1700 r.p.m. with self-starters.



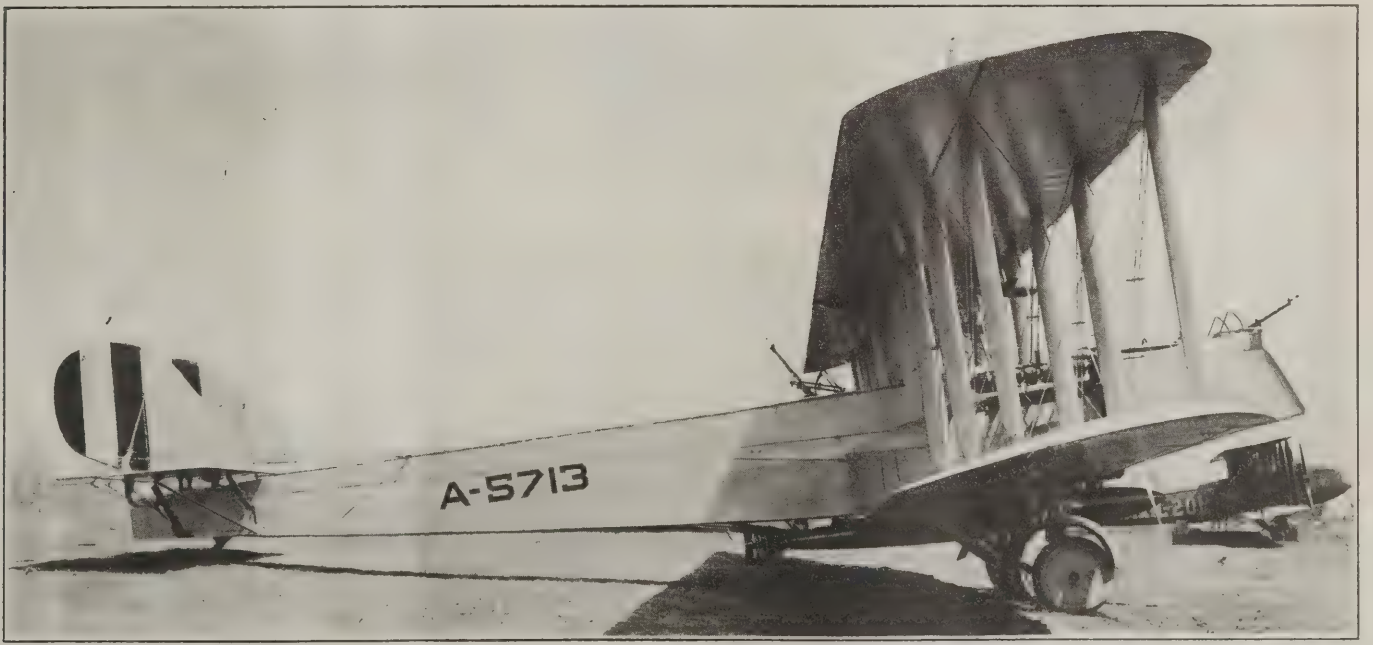
Pilot's cockpit showing arrangement of controls and observer's cockpit ahead in the Martin Torpedo-Plane

Ordnance Equipment

Two mounted Lewis machine guns.
Six Lewis gun magazine drums.
Thirteen sockets for magazine drums.
One 2100-lb. torpedo or the equivalent in torpedo and bombs.
Sighting and releasing mechanism.

Instruments

Tachometers, gasoline gauge, oil pressure gauges, clock, motometers, compass, altimeter, angle of incidence indicator, lateral indicator, dual Liberty switches, air speed indicator, tools.



Side view Glenn L. Martin new type Navy Torpedo-Plane

A De Haviland-9; one of the machines exhibited at the 3rd Pan-American Aeronautical Exposition by the Aircraft Sales Corporation

An Italian ace flying over the Congressional Palace, Buenos Aires, Argentina, in an S.V.A. Biplane

Mr. Harry Rouslere, of Ridgewood, N. J
Exposition

The veteran United States aviator Knox Martin who has been cre
shows him after landing at Hague, holding his pet

A line up of Bristol aeroplanes, constructed by the British and Colonial Aeroplane Compa

visitor to the Pan-American Aeronautic
aeroplane

The Norman-Thompson plane, also on exhibition at the Aeronautical Exposition

interest in flying in Columbia, Central America. The left photo
ight shows Mr. Martin and his first woman passenger

Lt.-Col. A. Guidoni, Italian Air Attache in Washington, one of the prominent visitors at the Atlantic City Aeronuatic Exposition

right: Bristol Babe, Monoplane, Badger, Fighter, Tourer and the 4 engined Pullman

PIONEER SINGLE-SEATER SPORTPLANE

The Pioneer Sportplane in flight at Central Park Flying Field, Long Island

FLIGHT tests of the Pioneer Single-seater Sportplane have proven that the design of a small, light short-coupled biplane is most satisfactory for sport and commercial cross-country flying.

The test model, type "A", is the first machine designed for the Pioneer Aircraft Corporation by its Engineer, Harry Herzog, heretofore designer of numerous experimental aeroplanes and builder of flying models for the past ten years.

The success of this first Sport Model has been proven on its initial and subsequent trial flights as the machine has flown almost daily without any change in motor or machine design. During the course of construction, and when photographs of the plane were on exhibition at the New York Aero Show, considerable doubt was expressed as to the stability of such a small, light, short machine and whether the 40 horse-power motor would be sufficient for safe flying.

Trial flights were conducted at the Central Park Flying Field, Long Island, by Bruce Eytinge, formerly a First Lieut. flying instructor in the Royal Air Force and now a Captain in the NewYork City Aerial Police and last year as test-pilot and advertising manager for the Aircraft Engineering Corporation.

The machine was found to possess marked inherent stability and its performance embodies the best assets of commercial aviation such as a quick take-off, fast climb, ease of control and above all a very slow flat gliding angle with a landing speed under 25 miles per hour coming to a stop after an average roll of 60 feet without the use of any under-carriage skid or breaking device whatsoever. This feature makes the Pioneer the safest and most suitable for small fields or emergency landings.

Its wing spread of 24′, overall length of 15½′ and height of 5¾′ insure a very small and economical hangar for housing and workship facilities. It is strictly a one-man machine, not only in flying but in being handled on the ground as well, as one can easily pull it into the hangar alone without the aid of a mechanic or extra help because of its lightness. High grade construction is the first requisite which proves itself in giving a factor of safety of over 8.

To the above qualities are added the items of moderate cost and upkeep. The selling price being $2000, places the machine well within the reach of any pilot and the maintenance is one-fourth that of the average aeroplane. The gasoline consumption is under four gallons per hour and with a 10 gallon tank one has a cruising radius of 2½ hours.

This machine has been designed with the idea of it being used not alone as a sport plane but for commercial purposes as well, such as aerial mail, light express, advertising, exhibition work, aerial police, forest patrol, army messenger planes and navy scouts to fly from and land upon the deck of a ship.

On May 7th a cross-country hop was made to Mitchel Field, Long Island, to witness the Intercollegiate Aviation Meet where spectators were surprised at the stability and performance of such a small craft flying and landing safely in a 40 mile an hour wind.

Specifications

Performances

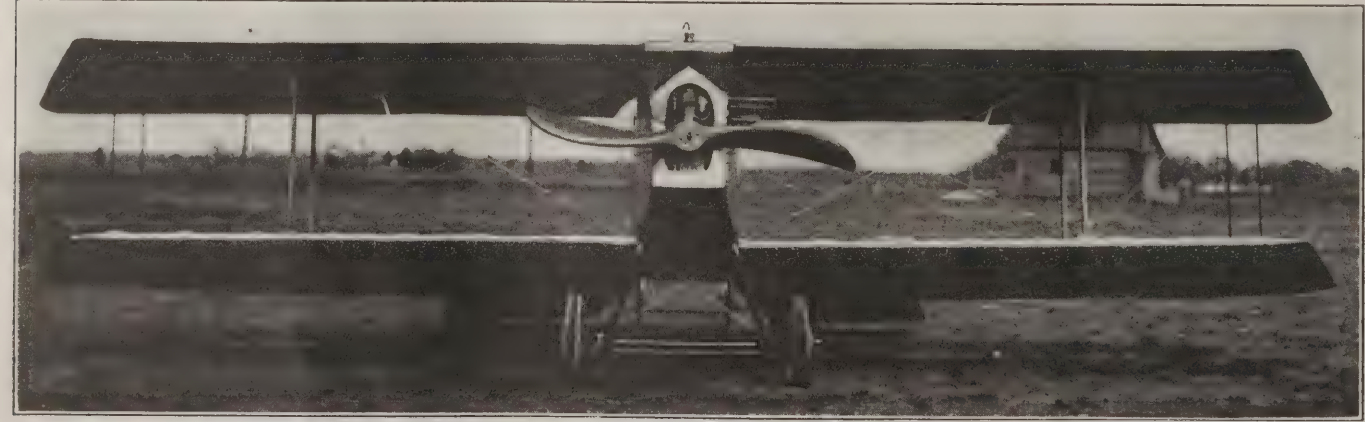
Single-seater	
Engine, Pioneer 4 Cyl. Vertical water-cooled,	40 h.p.
Weight, Machine empty	480 pounds
Weight, fully loaded	800 pounds
Useful load	320 pounds
Flying range at full speed	175 miles
Maximum speed, sea-level	75 m.p.h.
Economical speed	40 m.p.h.
Landing speed	25 m.p.h.
Radius of action	2½ hours
Fuel Consumption	4 gal. per hour

Dimensions

Span, upper wing	24 feet
Span, lower wing	24 feet
Overall length	15½ feet
Overall height	5¾ feet
Stagger	5 inches
Gap	39 inches
Chord	50 inches

Controls

Lateral and longitudinal balances are operated by stick control. The double balanced rudders are operated by a foot bar. All controlling surfaces are large and afford ease of control and the response is so immediate as to require but a slight movement of the stick or rudder bar.



Front view of the Pioneer single seater Sportplane, equipped with 40 H.P. engine

Fuselage

The fuselage is of good streamline form and neat appearance. It is of 3 ply veneer construction throughout. The engine is mounted on engine bearers supported by front and rear sheet steel engine plates. The rear plate also supports the radiator, the top of which is anchored to the centre section.

The pilot's cockpit is deep and roomy for protection and freedom of motion. The instrument board is fitted with an Engine Revolution Counter, an Oil Gauge, an Altimeter, a Water Temperature Gauge and an Ignition Switch.

Landing Gear

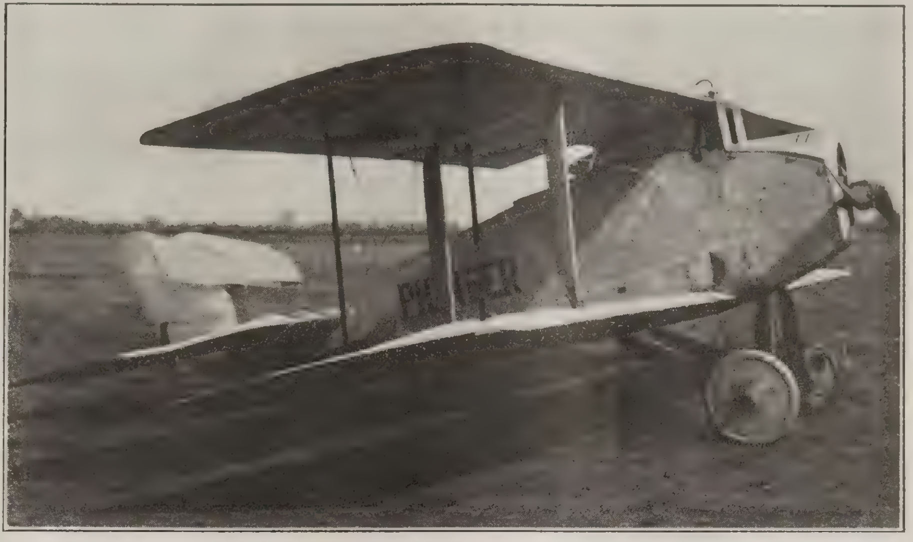
The chassis is of the ordinary V type. Elastic cord shock absorber binds the axle to the struts. 26" diameter wheels will be used with a tread of 60" which eliminates the necessity of wing skids.

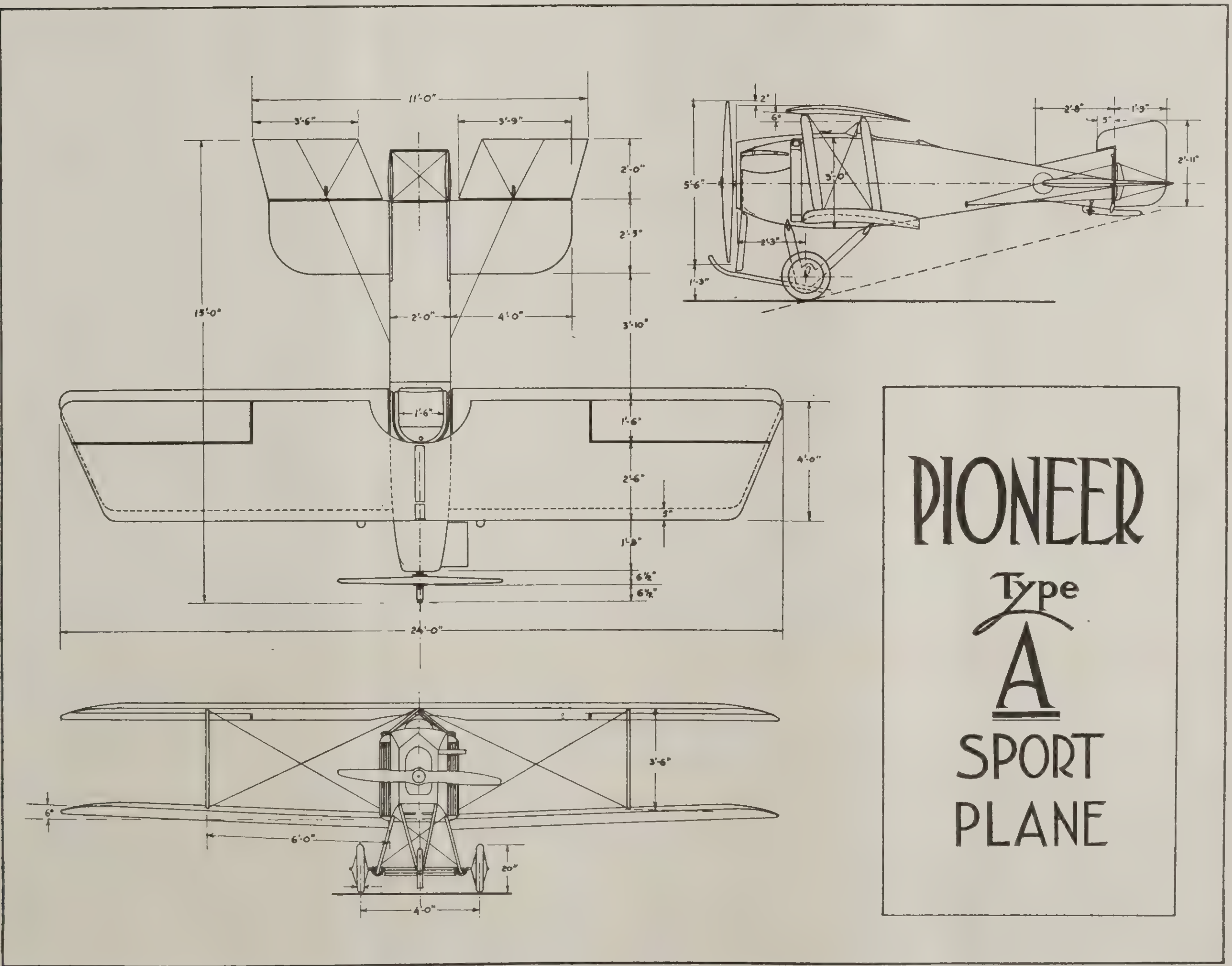
Tail Group

The wide tail plane is a fixed horizontal stabilizer of double cambered surface to which is hinged the elevator flaps. The vertical fins are fixed stabilizers to which are hinged the balanced rudders.

Motor Group

A Pioneer 4 cylinder vertical 8 valve-in-head 40 H.P. water-cooled motor is used. It has been so carefully balanced as to entirely eliminate vibration. Its weight is 150 pounds. The cooling system is Thermosyphon with ample water capacity. 5' pitch x 6½' diameter Paragon Propeller is driven direct from the crank shaft at 1525 r.p.m. The Atwater Kent battery ignition system is used which affords ease in starting. The lubrication is splash feed and a constant spray by a spur gear oil pump. The gasoline system is gravity fed from a ten gallon tank in front of the pilot and separated from the motor by an asbestos fire wall. A Zenith carburetor is used which affords economic and efficient carburetion.


Pioneer Sportplane, showing the double rudders



Plan of Pioneer Sportplane, using 40 H.P. water-cooled engine

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

At the end of the war, salvage was to be similarly apportioned in determining what each should pay (p. 761).

For illustration, the expense of spruce operations in the Northwest reached about $50,000,000. Early in 1919 England desired to strike a settlement. The spruce accountant at Portland made an estimate of all Government spruce production property then on hand and gave to logging railways, which cost $9,845,106 (p. 1593), a salvage value of $750,000, or less than 8 per cent of cost (p. 2859). Property on hand was salvaged at $3,908,000, according to the schedule, and on that basis it was contended that a large part of the losses would be borne by our allies while any excess in salvage over estimated receipts would go toward reducing our own expenses.

This arrangement will not be completed until all the property has been sold and judging from conditions disclosed to the committee no one can determine when that will be.

Spruce production losses will be large, because of riotous extravagance disclosed on every hand. War brings waste and the committee during the investigation has been more immediately concerned in ascertaining causes for failure to produce spruce promptly. However, certain facts that have come to the committee's attention are briefly presented.

Spruce Cost England $802.20 Per Thousand Feet

The cost to Great Britain for aeroplane timber furnished under Col. Disque's management has been placed in the record as follows:

> On the basis of 10 per cent salvage or the basis they settled with England on, spruce would cost $802.20 a thousand, fir $287.20 and cedar $895.20 (p. 2304).

That would be the cost to all Governments participating on a basis of 10 per cent salvage for spruce property sold. It was contended by spruce officials that 10 per cent is a low estimate. Exact cost cannot be determined until the accounts are closed up, but on a 20 per cent salvage basis, the spruce would cost $754.50 per thousand; fir, $271.50; and cedar, $851.70 (p. 2303). The average actual cost based on final salvage and closing up of business will probably range around the figures quoted.

Over $30,000,000 Wasted Through Mismanagement

The American Government has advanced over $30,000,000 of unnecessary expense in the production of 143,000,000 feet of aircraft lumber from October, 1917, to the end of the war according to the committee's expert accountant.

The highest price paid for such lumber furnished by independent contractors to the Allies prior to Col. Disque's control, and the highest price paid by his predecessor in this country was $110 per thousand for spruce and cedar and $65 per thousand for fir (p. 2304). Upon the basis of these figures the expert accountant for the committee testified that the excess cost through Col. Disque's mismanagement and abortive attempt to produce aircraft lumber reaches $35,796,324 on a 10 per cent salvage basis, and $33,447,837 on a 20 per cent salvage basis. Great Britain's individual loss on her settlement on a 10 per cent salvage was $11,096,859. Our own loss will be subject to deductions from any payments made by France and Italy (pp. 2303-2304).

In this connection it should be kept clearly in mind that the governmental cost-plus contractors, upon the undisputed evidence, produced only 7.4 per cent of the timber from which was secured the 143,000,000 feet, while the independent contractors, disorganized as they were, produced 92.6 per cent thereof. These figures show conclusively what could have been accomplished by co-operation and concentrated effort of the independent operators under the direction of an expert lumberman.

Disque's Cost-plus Operation

Upon reaching the Northwest, Col. Disque called in Government forestry officials and others for counsed. After receiving their advice he apparently proceeded to do as he pleased. His three illegal cost-plus contracts have been mentioned. One was given to the Airplane Spruce & Lumber Co., of Grays Harbor, of which Alexander Polson was president. He was also a large independent logger at Grays Harbor. Mr. Polson testified in reference to the railroad, which Col. Disque ordered his company to build, as follows:

> We would never have built the road ourselves. They delayed the work from June 6 to October 6 (1918), practically making no progress. It hindered our company getting out twenty to thirty million feet of spruce and hindered the Airplane Spruce & Lumber Co., which is the cost-plus company, from getting out from six to ten million feet before the war ended (p. 2026).

Mr. Polson further testified that Col. Disque's methods prevented him from producing in two operations between thirty and forty million feet of logs (p. 2026). No logs under the company's contract ever reached the market, but there was paid the company $1,664,576 in settlement of the contract.

A second cost-plus contract was given to the Grant Smith-Porter Bros., a company that had no experience in logging or lumbering. Wasteful methods were alleged in testimony, but the most serious criticism is that many months of preparation were taken without getting any logs to market, while their bill, which was paid, reached $3,349,903.

A third cost-plus contract was given to the Warren Spruce Co., an offshoot of the Warren Construction Co., of Boston, Mass., that builds highways and has an uncertain record that your committee was unable to investigate, although urged to do so. (See Kerrigan report, p. 2384.) The Warren Spruce Co. is the company that Lieut. Kerrigan says was given a cost-plus contract reaching unmeasured millions in exchange for unlimited power to be given Col. Disque (pp. 2351-2354).

Neither the Warren Construction Co. or the newly organized Warren Spruce Co. ever had logged a stick of timber, but Col. Disque gave them a generous contract, and notwithstanding that they spent money lavishly, according to the testimony, no spruce logs ever reached the market under such contract. There was paid to them on this illegal contract $5,671,237 (p. 2857).

A Broadway Firm's Fat Contract

The Siems-Carey-H. S. Kerbaugh Corporation, of Broadway, New York, a cost-plus contractor, secured a more liberal contract than the others. This corporation owned no timber, was without any logging or lumbering experience, and never produced any logs that reached the mills, after six months' work. This corporation was paid $8,329,659. More will be said of this company and its contracts, but it is a singular coincidence that the Siems-Carey Canal Co., of New York, of which the Siems-Carey-H. S. Kerbaugh Corporation was an offshoot, was controlled through the ownership of 51 per cent of its stock by the American International Co., of New York. Director of Aircraft Production John D. Ryan was an influential director of the American International Co. when Carey, the leading figure of the Siems-Carey-H. S. Kerbaugh Corporation, received his two cost-plus contracts, one of which—the railroad contract—Mr. Ryan refused to approve, because of his own connection with the Milwaukee Railroad; but the other—the spruce contract—an estimated expenditure of $23,000,000, for which the railroad was ostensibly built, he did approve.

(*To be continued*)

NAVAL and MILITARY AERONAUTICS

Col. William J. Kendrick Now Director of Aircraft Production

Announcement has been made by the War Department appointing Col. William J. Kendrick, A. S. A., as Director of Aircraft Production in place of Major Benjamin D. Foulois, A. S. A., who has been relieved.

Altitude Records Sought By Army Air Service

Dayton, O.—Two army bombing planes are being equipped with glass inclosed cabins and super-charging devices preparatory to tests which, it is hoped, will eclipse all previous altitude marks. The motor also will be inclosed and sealed. While no official announcement has been made regarding the experiments, it is understood the Air Service believes the planes now being equipped can go up 40,000 feet or more. If they can be developed satisfactorily they would be used for bombing and observation purposes in time of war.

Army Buys Goodyear Blimps

The Goodyear Tire and Rubber Co., has closed negotiations with the War Department for the sale of two pony blimps which will be used for training purposes as well as for aerial co-operation with other branches of the military service. They will be valuable for artillery spotting, observation, scouting, aerial photography and map making.

Army Helium Plant Moved to Langley Field

The entire equipment of the Air Reduction Company used in Texas for the purpose of extraction of Helium from natural gas, better known as Helium Experimental Plant No. 2, has been moved to Langley Field, Hampton, Virginia. This plant will handle the new non-inflammable gas for lighter-than-air ships.

The original plant with certain modifications is now being designed by Harvey N. Davis, of Harvard University, and will be erected primarily for the purpose of repurification of helium gas after it has been used in airships and has lost a percentage of its lifting power because of oxygen and nitrogen impurities entering through the fabric. The plant will also be utilized for experimental and development work of new processes for the production of balloon gases.

Former Pilots of Rockwell Field Can Obtain Pilot Books

Aerial Age has been requested to announce that all former officers and others trained as pilots at Rockwell Field who either received the R.M.A. rating there, or were eliminated from such training for any reason and who are not now in the possession of their pilot books, will receive them if they forward their present address to the Commanding Officer, Aviation Supply and Repair Depot, Rockwell Field. The Air Service administration has recently directed that such books are to become the personal property of the individual to whom they pertain and that distribution be made accordingly.

Salvaged Aeroplanes Stored at Love Field

Love Field, Texas, has been the scene of much activity during the past year due to its designation as a transfer point for the transfer of the aeroplanes sold by the War Department to the Curtiss Aeroplane and Motor Corporation. All aeroplanes from the various fields of Texas, Oklahoma and Louisiana listed on this contract for transfer were shipped to this field and the transfer accomplished there. To date, a total of 1061 aeroplanes of various types of Curtiss JN's and 1481 OX-5 motors have been received and 550 planes and 620 motors of this number have been released to the Curtiss Aeroplane and Motor Corporation.

Officers Complete Parachute Course

The second class of officers has graduated from the parachute course at Kelly Field, Texas. Among the officers who jumped were Major William G. Schauffler and Lieut. J. C. Wilson. Both officers made successful jumps, from the rear cockpit of a De Haviland 4-B. It is interesting to note that there is not the slightest danger of entanglement with the tail group of a plane when jumping from a plane with a U. S. Army type parachute. The jumper follows the same course as a bomb and travels downward and forward. Experiments have also proved that there is no danger of becoming entangled when jumping from a plane in a spin as the centrifugal force will throw the jumper to the outside of the spin and not backward and upward. All Air Service Mechanics' School Officers are now taking the course in Parachute maintenance and folding and all are looking forward to jumping.

New Policy Relative to Aerial Observers

Plans for a fuller co-operation of field forces of the U. S. Army with the Air Service have been outlined by the Secretary of War in a declaration of policy relative to the training of aerial observers. The Secretary directs that the Air Service Observation School include officers of the Infantry, Cavalry, Field Artillery and Coast Artillery, who will be selected by the War Department to supervise instruction in all matters requiring a knowledge of the tactics or technique of their respective arms. In order to qualify for rating as an aerial observer a student will be required to pursue a course in an Artillery school, the staff of which school includes an Air Service officer. During target practice of the Field Artillery and Coast Artillery the observation squadrons will train with the Artillery. During periods of field training, and especially maneuvers, the squadrons will train with the Infantry, Cavalry and Artillery.

Aeroplanes Carry Injured Officer to Hospital

Washington.—An officer of the 16th Cavalry, stationed at Zapata, Tex., who had been seriously injured in a baseball game, was rushed by aeroplane to the base hospital at San Antonio, 350 miles away.

The commanding officer at Zapata requested the air service commander at Kelly Field to send a plane to serve as an emergency ambulance. The terrain immediately surrounding Zapata offers no landing fields, but Lieut. McGowan, piloting a De Haviland plane, skilfully manoeuvred and landed on the highway, picked up the injured officer and headed for San Antonio .

One of the oil leads on his engine broke, and for miles he fought the disconcerting stream of oil from the break. He was finally compelled to land when a second lead broke. Immediately upon landing he discovered another plane passing over him, signalled it down, and transferred the injured officer, who was piloted safely to the base hospital without further incident.

Promotions in U. S. N. R. F. Flying Corps

The Bureau of Navigation, Navy Department has announced its policy in regard to the promotion of Class V officers in the U. S. Naval Reserve Corps. This class constitutes the Naval Reserve Flying Corps and about 1,500 officers will be affected by the procedure adopted, which reads: "Running mates for promotion in provisional and confirmed ranks have been assigned to Class V officers as follows:

"All officers of Class V who were lieutenant commanders on April 15, 1920, have been assigned as a running mate Lieut. Elmer E. Hough. All lieutenants on April 15, 1920, have been assigned Lieut. James P. Compton. All lieutenants (j.g.) on April 15, 1920, have been assigned Lieut. Kenneth M. Hoeffel. All ensigns on April 15, 1920, have been assigned Lieut. (j.g.) William Butler, jr.

"All Class V officers who have performed the required amount of service and are passed by the Confirmation Board will be confirmed in the provisional rank they held Oct. 1, 1919, which was the date their cases were submitted to the Confirmation Board.

"All provisional and confirmed commissions in effect on April 15, 1920, will remain in full effect.

"Future promotions in provisional and confirmed ranks will be governed by the temporary and permanent promotions of the running mates. In accordance with the Regulations Governing the Organization and Administration of the Naval Reserve Force (1920), lieutenants (j.g.) and ensigns will not be considered eligible for promotion with their running mates until they have completed three years in their respective grades."

Aerial Photographs Made of Flooded Area

During the recent high water stage on the Miami River when portions of the district surrounding Dayton, Ohio, were flooded, numerous flights were made over the flooded districts for the purpose of taking photographs. Permission was granted to the local newspapers to publish some of these photographs, which created wide-spread interest in the activities of the Air Service at McCook Field. The pictures demonstrated the use of aeroplanes in relief work in flooded sections as it would have been very easy to drop packages of food to isolated sections in case such action would have become necessary.

FOREIGN NEWS

Zeppelins for France

Two Zeppelins which have been allocated to France under the Versailles Treaty are to be delivered shortly. One is the L-72 and the other is an LZ of recent construction. The first will be handed over to the Navy and taken to Cuers-Pierrefeu, the naval air station in the Var. The other will be transferred to the Department of Aerial Transport and placed in the hangar at Maubeuge, which the Germans enlarged during the war. The airships will be taken to France by German crews under the control of a special mission, which will leave Paris when notice is received from the Inter-Allied Aeronautical Mission.

Aircraft Exposition in Italy

The Aero Club of Italy has arranged for an Aircraft Exposition to be held during 1920. It will be in three parts, one at the Aerodrome at Baracca (Centocelle), the second at Monticello, where there is already a large museum of Italian and foreign aircraft, and the third at Ciampino, which will be used as a haven for airships.

France Plans Air Service to Her Colonies

What is said to be the first regular intercontinental aeroplane mail and passenger service has not only been definitely established between Toulouse and Casablanca, but has proved a striking success.

Casablanca, the chief commercial city of Morocco, was accessible from France only after a long, costly and somewhat painful journey. Now, however, all one has to do is to take an evening express from Paris to Toulouse, climb aboard a waiting plane, and arrive before sunset next day in the white Moroccan city.

The route follows more or less the coast of Spain, so as to avoid flying over the high mountains of the Iberian Peninsula. The most interesting part of the trip is the flight across the Straits of Gibraltar.

From Gibraltar, the flight is continued along the Spanish coast as far as Tarifa, where the straits have a minimum breadth. After a flight of eight minutes from Tarifa, one is already above the harbor of Tangier.

The use of aeroplanes has been widely extended to commerce in France and the development of services similar to that between Toulouse and Casablanca is being encouraged. While this particular service, which is on a bi-weekly schedule, was established through private enterprise, the French Government has given its official approval by granting a subsidy to M. Latecoere, a merchant of Toulouse, who decided to make the venture at his own expense.

Seven Zeppelins Fly to Russia

Paris.—Seven German Zeppelins have been seen going east over Warsaw, according to newspaper reports from the Polish capital. It was believed they are going to Russia from Germany with military instructors.

Holland Develops Aviation Division

The Dutch government is lending substantial support to aviation. Holland has bought all the French planes which were interned in that country during the war and a large number of German machines interned there.

A committee of the directors of Vickers House at The Hague and several officers of the Dutch Indian army are making technical studies in the Vickers factories in England. The committee is preparing itself for the establishment of factories in Holland and the Dutch Indies as well as for the delivery of machines.

Aeroplanes and hydro-aeroplanes needed for military operations in the Indies have been ordered from Vickers factories. The Dutch government will subsidize a factory to be erected at Amsterdam by Fokker.

The Dutch propose to establish an aerial mail service between Rotterdam, Flushing and the Zeeland islands. Another route under consideration is one from Holland to its East Indian colonies.

Handley Page Records

Since the inauguration of civilian aviation in Great Britain on May 1st, 1919, until April 24th, 1920, inclusive, the records of the Handley Page Commercial Aeroplanes are as follows:

Total number of passengers carried 4,460. Total amount of freight carried 69,423 lbs. Total mileage flown 100,188 miles.

As far as has been possible, these figures have been collected from all over the world, and they represent the activities of Handley Page Commercial Aeroplanes in the United Kingdom, France, Belgium, Holland, United States of America, India, South Africa, Poland, Scandinavia, China, Greece, Spain, etc.

Handley Page Commercial Aeroplanes have now flown over a distance of more than 100,000 miles.

Fly Over the Forbidden City

The vivid description by a Chinaman of a flight over Pekin, in a Handley Page aeroplane, provides an interesting illustration of the possibilities of aerial touring.

"Those who have never seen Pekin from the air have never seen it at its best. The Altar and Temple of Heaven, in their groves of cypress trees are an impressive sight as seen from above. Wonderful also is the panoramic view of the Forbidden City, its gold-tiled roofs and frozen lakes glittering in the sunshine. The precision with which the city is laid out is wonderful when one sees it from above, its massive walls, enclosing it from the gaze of all outside but those who venture into the air. At a height of 4,000 feet over Pekin,, huge walls look like tiny footpaths, men and women become invisible to the naked eye and the mass of grey-tiled roofs surrounding the Forbidden City looks like a carpet of ashes.

Flyer Reaches Tsingtau In Rome To Tokio Flight

Shanghai.—Lieut. Ferrarin, first of the aviators in the Rome-Tokio flight to reach Shanghai, left from this city to Tsingtau. He will proceed to his objective by way of Peking, Mukden, in Southern Manchuria, and Seoul, Corea. Lieut. Masiero, the second of the Italian Aviators in the flight, who crashed recently at Canton, came to Shanghai by steamer. After obtaining a new machine he will follow the route taken by Lieut. Ferrarin.

A Blackburn for the India Flight

The Blackburn Aeroplane and Motor Co. is entering a Blackburn "Kangaroo-Rolls-Royce" to be piloted by Mr. Reginald W. Kenworthy, in the flight to India and back for the *Daily Express* £10,000 prize. It is understood the *Yorkshire Evening News* is bearing the expense of the venture, apart from the aeroplane itself. Mr. Kenworthy, the chief pilot of the Blackburn Co., has had lengthy experience with the Kangaroo machine, having flown it successfully at the Dutch Aero Show at Amsterdam, carried the Glasgow mails during the railway strike, and. more recently, been carrying out the trips between Yorkshire and Amsterdam.

Turin Exhibition Postponed

The International Aviation Exhibition which was to have been held at Turin at the end of April and the beginning of May has been postponed to October next.

Swiss Encouraging Aviation

The Swiss Government has set aside a sum of two million francs for the improvement of aviation while three million francs is to be spent on the purchase of new machines.

Airship Station for Edinburgh

Representatives from an aerial syndicate in England visited Edinburgh recently with a view to examining and reporting upon the suitability of any of the aerodromes in the vicinity of the city for an airship terminus. It is understood that Edinburgh will become the terminus for the English route and also for the Norwegian crossing.

New Air Service Started

Amsterdam.—The first regular air service has commenced between London and Amsterdam. The Royal Netherlands Aero Company has contracted with a British company for a three times weekly service, carrying passengers, parcels and mail. If this service is successful it will be the beginning of a network of services with Germany, Denmark and the whole of Northern Europe. Contracts already have been made with five companies.

The voyage from Amsterdam to London, taking about three hours, costs 150 florins ($60). The route is via Ostend and Calais, crossing the narrowest part of the Channel.

Aviation in Scandinavia

Representatives of the four Scandinavian countries have drafted laws to cover aviation in their respective countries, and they are to be submitted shortly to the four Parliaments.

An Aerial Post in Germany

It is stated that an aerial post will shortly be opened at Innsbruck in Germany, and that it will serve as the starting point of several aerial services in that country.

France Concerned Over German Aerial Activities

Paris.—Apart from payment of the German indemnity the only international anxiety troubling France is the question of German disarmament. André Michelin, of automobile tire fame, sounds the cry of alarm on the subject of aviation, declaring:

"In two months Germany will escape from control of inter-Allied commissions. She then will be able to construct as many aeroplanes as she wishes."

Michelin, who is the new president of the Aero Club, says Germany at times since the armistice has been able to put out 2,200 aeroplanes and 1,900 motors monthly. At Friedrichshaven she is just finishing a gigantic aero-dynamic tunnel and laboratories wherein a Zeppelin of 80,000 cubic meters capacity can be constructed in six weeks.

M. Fokker Speaks to Dutch Aviation Association

Lecturing before the Royal Dutch Aviation Association at Rotterdam, M. Fokker expressed the pious hope that it would not be necessary for him to seek financial help abroad again, but that it would be found in his own country. He emphasized the need for developing machines which could leave the ground after a very short run, and instanced his new commercial machine as an example of what could be done. He expressed the idea that the improved reliability of aeroplanes would render seaplanes superfluous for overseas work except for trips between islands. He also pointed out the necessity for the extension of the application of wireless telephone and telegraph, and the improvement of instruments for ascertaining heights, and so on, are necessary in order to make flights possible in fog at night, and under other hampering conditions.

Belgian King and Queen Go to Wedding in Aeroplane

London.—King Albert and Queen Elizabeth of Belgium recently left Brussels for England by aeroplane.

They went to attend the wedding of Lady Cynthia Curzon, daughter of Earl Curzon, to Lieut. Oswald Ernald Mosley, Coalition-Unionist member of the House of Commons.

German Air Force to Disappear Soon

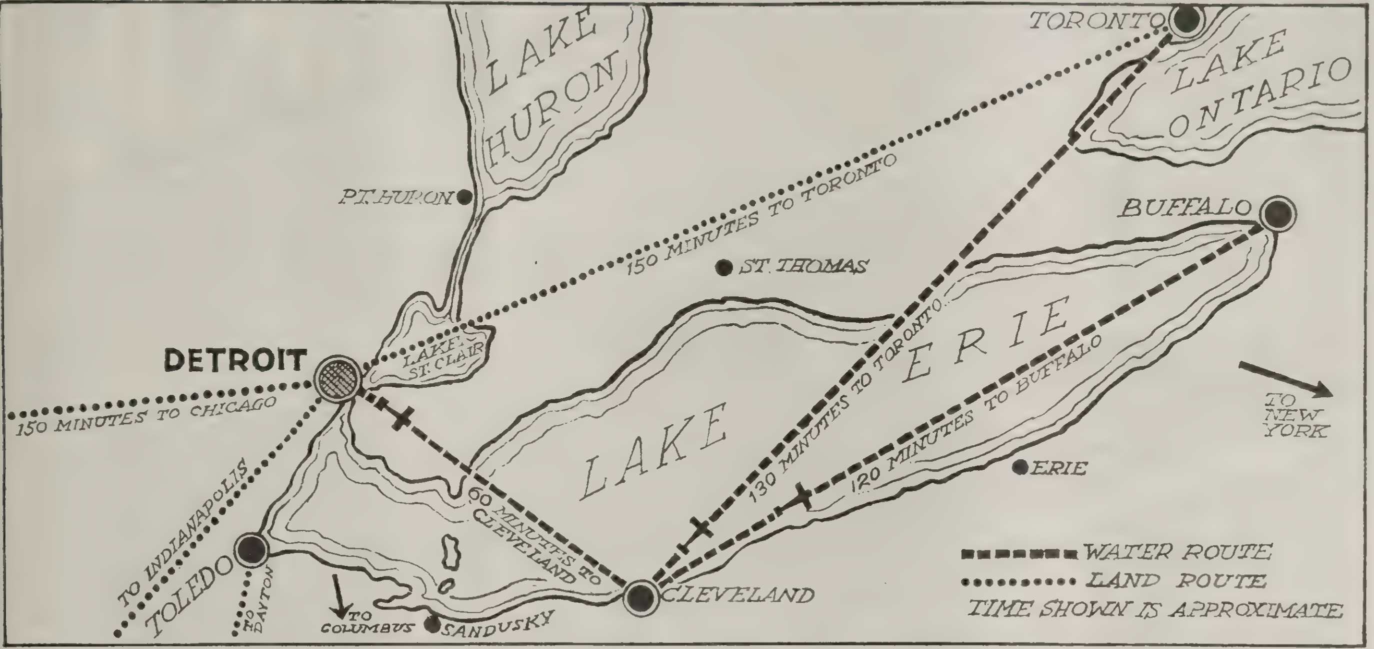
London.—Not even one hangar and aeroplane factory, which the *Tageliche Rundschau* complains is all the Allies will permit Germany to have for the purpose of international aviation, will be left in Germany for military purposes when the Allied Air Commission has finished its work.

Every aerodrome, flying machine and aircraft manufacturing plant, representing a cost of 60,000,000 marks, will be destroyed.

Although aircraft construction was expressly forbidden Germany for a period of six months following the signing of the armistice, during that time she has built the Zeppelin Bodensee and many aeroplanes. The Bodensee probably will be demanded by the Allies.

The Allied Air Commission in Berlin under Commodore Groves of the air forces have met and overcome all the obstructions placed in their way by the Germans. Every air plant in Germany has been inspected by the commission and a considerable amount of aircraft material discovered. The German excuse always was that the aeroplanes were for commercial purposes.

PROGRESS DEMANDS SPEED



The U. S. Aerial Express Company

is engaged in the business of transportation between cities, carrying passengers, freight, mail, express or any other commodity that is profitable.

It also does such additional things as advertising, photography, mapping.

It is ready to act as agent or distributor for aeroplane manufacturers, importers, makers of aeroplane parts, aircraft insurance houses, etc.

Our first project is the establishment of an aerial transportation line between Cleveland, Buffalo, Toronto and Detroit.

Assignments of ships for aerial transportation have been made covering territory of Great Lakes, Mississippi River, Gulf States, Pacific Coast to Alaska and the Hawaiian Islands.

We use U. S. Navy type flying boats of 800 h.p. with a capacity of 5,000 pounds, or twelve to fifteen passengers, a crew of two, and about 1,000 pounds of mail, express and luggage.

Smaller flying boats and land planes will be used to carry on work where the large planes cannot be profitably employed.

THIS COMPANY IS COMPOSED OF PROGRESSIVE BUSINESS MEN OF DETROIT, CLEVELAND AND BUFFALO.

Commercial aviation is an established fact in England, France and Germany. Our business is to put it on the same basis in the United States.

Average time between Detroit and Cleveland is 75 minutes, saving about six hours on the fastest time possible by rail. Between Buffalo and Detroit is about three hours or less. It will allow a business man to go to Cleveland and return before noon if he starts from here in the morning. It will save from 10 to 24 hours on delivery of mail from the East to business concerns in this vicinity. Night trips carrying special freight, mail and express to and from the East will be in demand.

CAPITALIZATION $100,000.00
PER UNIT

General Offices
STATLER HOTEL
DETROIT

Offices
Statler Hotels
Cleveland
Buffalo

Pennsylvania Hotel
N. Y. City

AERIAL U.S. EXPRESS
COMPANY

We invite your correspondence on aerial transportation.

BELLANCA AIRCRAFT

MARYLAND PRESSED STEEL CO. (AIRCRAFT DEPT.)
HARRY E. TUDOR, Sales Manager 299 MADISON AVENUE, NEW YORK CITY

(*Continued from page* 361)

longer to get to San Francisco. During the month of January 1920, the 8:40 train out of New York missed this transcontinental connection out of Chicago 100 per cent of the time.

The Aerial Mail can be 12 hours behind its schedule from New York to San Francisco and still beat the train mail into the Golden Gate City by 20 hours if the train connection is made at Chicago, and by 44 hours if that connection is missed.

This is only the beginning of commercial aviation in the United States. It is being accomplished with military planes which are not adapted for commercial service. The work that has been done by the Post Office Department has received perhaps greater recognition in Europe than it has by the people of this country. Foreign diplomatic representatives have sent the fullest reports to their Governments about the Aerial Mail operations and have expressed to the Post Office Department their heartfelt admiration of the service, its dependability and economy of operation.

The Aerial Mail has made many contributions to aviation, the greatest of these being the salvaging and rebuilding for commercial work of more than 100 De Haviland war planes, and finally, the transformation of the single motored De Haviland plane into the double motored plane, either of whose two motors can keep the aeroplane in the air and enable it to reach its destination.

At the recent Aeronautical Show, in New York City, the greatest advance shown in aeroplane construction consisted of two planes built originally for the Post Office Department. One of these is the largest ship ever constructed in America, which can carry two tons of letters, and the other is a specially designed mail plane which can carry a mail load equal to 50 per cent of its own weight. Heretofore one of the elements of expense in carrying mail by aeroplane has been that an aeroplane had to carry three-fourths of its total load as dead load with only a 25 per cent commercial load.

The Aerial Mail has developed a staff of excellent aeronautical mechanics, the result of whose work is seen by the records of some of its pilots. One notable instance was that of a pilot who in eight months made 106 trips with but a single forced landing, due to mechanical trouble. On the Chicago-Cleveland Division in 1919, 205 consecutive trips of 325 miles each were made without a forced landing for any cause whatever. The Aerial Mail has come to New York from Washington and from Chicago in gales and snow storms which tied up harbor shipping. It has arrived in Cleveland and in Chicago when it was the only means of transportation operative. During the recent tornado that passed over Ohio and Illinois, in which 103 persons were killed and the buildings in cities and villages wrecked, the Aerial Mail made its flight through that storm and arrived safely with the mail in Chicago.

In the two years' operation of the Aerial Mail Service, only six pilots have lost their lives while transporting the mail.

Two years of the closest attention to every detail in the operation and development of the Aerial Mail Service has demonstrated that it will supplement every present mode of transportation but it will not for some years supplant them nor even cut into their operations to be felt as a financial factor. There is nothing in prospect, Second Assistant Postmaster General Praeger says, that would justify any man in saying that the aeroplane soon will carry all of the mail or all of the passenger transportation of the country, but it will ever be a most effective aid in speeding up commerce and production through efficiently covering those operations of transportation requiring excessive speed at increased cost over existing media.

Celebrate Second Anniversary

The Post Office Department celebrated the second anniversary of the inauguration of the Aerial Mail service on Saturday, May 15, at its aviation fields at Newark, N. J. and Washington, D. C., with special flights between Washington and New York in the first planes used in the service. Major L. B. Lent, General Superintendent of the Aerial Mail Service, flew from Washington to New York, and C. I. Stanton, Chief of Maintenance and Supplies, from New York to Washington in these veteran planes. Postmaster General Burleson and other postal officials were present at the College Park field, Washington, and other officials witnessed the flights from the Newark field at the New York end.

Personal Pars

Lieut. Jacinto Rodriguez Diaz, of the Guatemalan Army, has just completed a course of training at the flying school conducted by The Philadelphia Aero-Service Corporation. Lieut. Diaz was awarded a pilot's license issued by the Aero-Club of America and has sailed for home to impart the principles of aviation to officers in the Guatemalan Army.

Lieut. Diaz, is only eighteen years old and came to the school in February last.

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MAY 31 1920

AERIAL AGE
WEEKLY

. 11, No. 12 MAY 31, 1920 10 CENTS A COPY

The Inlet and Curtiss Flying Station at Atlantic City, Where the Flying Events of the Third Pan-American Aeronautic Congress Were Held

United States to Lead in Aerial Merchant Marine

LISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
criptions: Domestic, $4; Foreign, $6. Entered as second-class matter March 25, 1915, at the Post Office at New York under the act of March 3rd, 1879

In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

Aerial Transport Service

which, it is hoped, will eventually serve all of the important cities on the North American Continent.

The plans for this service have been developing for months and will vitally influence Civil, Commercial and Military Aviation throughout the world.

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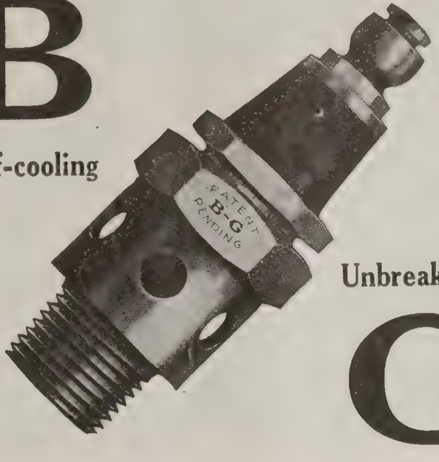

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AERIAL AGE
WEEKLY

VOL XI. MAY 31, 1920 NO. 12

TABLE OF CONTENTS

PAGE

United States to Lead in Aerial Merchant Marine 395

The News of the Week 397

The Aircraft Trade Review 399

U. S. Aerial Mail 400

The Exhibits on the Steel Pier at Atlantic City 401

Industrial Department 402

Aeronautic Instruments 403

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures 406

Naval and Military Aeronautics 407

Foreign News 408

Elementary Aeronautics and Model Notes 409

Aeronitis 410

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J. H. Highland giving instructions to W. M. Woodhead before the Oriole started on 500-mile journey.

~and the HIGHLAND GRAIN Co. too

Airplane Saves Grain Firm

Unable to arrange for the routing of several hundred carloads of grain as a result of the destruction of telegraph and telephone lies by the recent storm which swept the Middle West, a Grand Island, Nebr., firm of grain merchants saved itself several thousands of dollars as a result of the efficiency of the airplane.

The Highland Grain Company of Grand Island, Nebr., whose operations extend into Wyoming, Montano and Idaho, had many contracts to fill before the emergency freight rate, made on account of conditions brought on by the severe draught last season, was discontinued by the railroads on April 1.

On March 29, a severe wind and sleet storm completely cut off all telegraph and telephone communications in Nebraska, leaving the company without means of notifying its trade as to billing.

J. H. Highland, manager and owner of the Highland Grain Company, unable to use the mails because of the necessity of prompt action chartered a Curtiss Oriole airplane from the Grand Island Aero Company, distributors of Curtiss airplanes in Nebraska, and Pilot Earle Barnes, accompanied by W. M. Woodhead, one of the officials of the grain company, started out on a 500-mile trip. They visited all points in Nebraska from which they had grain to be moved, gave instructions as to shipping and as a result were able to fulfill every contract prior to the expiration of the drought rate.

This is the first time that the airplane has been used by grain merchants, but the company was so enthusiastic over the trial that it is planning to purchase an airplane for every-day use.

The Farmers' Grain and Coal Company of Palmer, Nebr., is undoubtedly the first company in the world to sell a car of grain to a representative of a wholesale firm using an airplane as a conveyance.

AIRCRAFT JOURNAL
May 1, 1920

Curtiss

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UNITED STATES TO LEAD IN AERIAL MERCHANT MARINE

FIGURES showing that the United States this summer will have a larger aerial merchant marine than all the other countries together, due to the organization of three large aerial transportation lines and the expansion of the aerial mail service provided by Congress were presented at the Third Pan-American Aeronautic Congress by Mr. Alan R. Hawley, Chairman of the Contest Committee of the Aero Club of America at the Third Pan-American Aeronautic Congress.

England has had two aerial transportation lines in operation between London and Paris, and France has had an aerial transportation line in operation between Paris and Brussels, but the three lines together are not as important and do not have as many pilots in service and have not covered as much tonnage as the United States aerial mail service during the past year.

Within three months there will be added the equipment of the three large aerial transportation corporations which are being organized, as follows:

(1) The Aerial Transport Corporation, incorporated for $15,000,000, which expects to put in operation 500 aeroplanes this year and increase to 1,500 aeroplanes within a year. The group which is organizing this stupendous system of aerial transportation lines throughout the United States and has made this record purchase—which is the largest purchase of aeroplanes ever made by anyone excepting Government—includes leading ex-army and navy aviators, among them connected actively and in an advisory capacity are Lieut. Commander P. N. L. Bellinger, U. S. N., who flew across the Atlantic as Commander of the NC-3 and is one of the oldest naval aeronautic experts; Major A. W. Harris, late of the United States Air Service; Colonel R. S. Hartz, late of the United States Army Air Service, who flew around the rim of the United States; John A. Jordan, Chief of Construction, the United States Aerial Mail Service, who took charge of the Aerial Mail Service under Second Assistant Postmaster General Praeger, at its very inception.

(2) The U. S. Aerial Express Co., which has bought thirty large twin-motored seaplanes from the Navy Department and is establishing aerial transportation lines over the Great Lakes and on the Atlantic and Pacific seaboards. Mr. Thomas F. Dunn, the president of the company, made the announcement through the Aerial League of America of the plans which had been withheld from the public pending the delivery of the first six seaplanes by the Navy Department, which are being converted to give maximum comfort for passenger-carrying service. The U. S. Aerial Express Company is engaged in the business of transportation between cities, carrying passengers, freight, mail, express or any other commodity that is profitable.

It also does such additional things as advertising, photography, mapping.

(3) The Lawson Airline Co., of which Alfred W. Lawson, the pioneer aeronautic enthusiast and aeronautic designer, is the president, has announced the inauguration of an air line in July. Mr. Lawson says:

"Our line will open first the Chicago and New York route. Landing fields for this route have already been contracted for. We will have stations in Chicago (Ashburn Field), Toledo, Cleveland, Buffalo, Syracuse, Rochester and New York City.

"We will have day and night ships. Each plane will carry twenty-six passengers or four tons of freight. A business man will be able to leave Chicago at 8 o'clock in the evening and be on Broadway at 6 o'clock the following morning.

"Our line will extend from Chicago to New Orleans, San Francisco, Seattle, Winnipeg, Quebec, New York and Washington. By 1921 our rates will be as low as railroad rates. The fare will be fitted to the middle class man's pocketbook."

Aerial Activities at the Airport

Aerial activities of the congress started even before the luncheon. Seven delegates, including two women, came by the air route and the day was climaxed by a wireless from President Wilson received at the naval section of the exposition on an outfit aboard one of the big seven-passenger seaplanes in which the nation's Chief Executive wished the convention "good luck." It was said to be his first wireless greeting to any convention.

First to breeze into the city by the sky, over the cross-country route, was Colonel Horace W. Hickam, chief of the information group of the air service, who climbed aboard a British SE-5 single-seater biplane, equipped with a Hispano-Suiza motor of 180-horsepower, in Washington at 9:30 A. M., flying over the Steel Pier headquarters of the convention at 11:30 A. M., after making the run in eighty-five minutes' flying time.

A little later Major Granville A. Pollock, chief of the New York Aerial Police, reached the airport here with the first woman delegate, Mrs. Emily E. Forsythe, of New York. They had hardly alighted before C. S. Jones, of the Curtiss Garden City Corps, reached the ground with Mrs. S. E. J. Cox, of Texas, who some months ago flew from her home State with her son to place him in a New England school. Lieutenants C. H. Himes and W. H. Cushing, U. S. Navy pilots, left Rockaway at eight o'clock this morning in one of the giant F5L twin Liberty-motored seaplanes and landed in the water alongside the pier at 9:15 A. M., opening up flights they will make tours daily over Atlantic City and along the coast.

Each day or two three seaplanes from Rockaway fly to Atlantic City carrying recruiting personnel and naval officials who have created great interest in the sale of Navy aeronautic material exhibited on the Steel Pier.

David McCullough, chief pilot for the American Trans-Oceanic Co., flew from Port Washington to Atlantic City on May 23 in the "Flying Fish" with twelve passengers.

Many Significant Messages

At the luncheon opening the convention many significant messages were received by authorities. Following are a few of them:

Message from the Honorable Juan Riano, Ambassador From Spain

NOT finding it possible to assist at the Grand Festival by which the Third Pan-American Aeronautic Congress is to be opened, and at which representatives of various countries are to be present, as I am not able to accept the invitation to this solemn act, I want to tell you that my thoughts are with you.

"I will be with you in spirit in your meetings although my voice will not be heard I nevertheless wish to show my sympathy with the Congress and to express my fervent wishes for the prosperity of the Aero Club of America, the Aerial League of America and the Pan-American Aeronautic Federation; trusting that this American triumvirate will form the bases from which shall depart the messages across the seas announcing to the world a definite peace and the consolidation of universal brotherhood."

Address by Senor Don J. Antonio Lopez Cuterrez, Minister from Honduras

MR. President, Members and Guests of this Congress: "I deem it an honor for me to have the occasion of addressing such an important gathering as this, composed of men prominent in science and in all walks of life.

'You are intent on carrying on the greatest revolution, destined to change completely the conditions of life in our planet. And what you have already achieved in this respect is a marvel.

"Ever since Senator Dumont, President of the Pan-American Aeronautic Federation, proved practically that machines heavier than air could be sustained in space and move rapidly imparting to them some direction, an immense horizon has been opened to the ingenuity of men. This portentious discovery is matched only by the discovery of America by Columbus. Indeed, who can, even now, imagine what aeronautics will bring in the future for the welfare of mankind? No one, when this continent was brought under the influence of civilization, foresaw that principles of liberty and justice for all men had been attained, and that privileged castes that made miserable nine-tenths of the population of the world were doomed to destruction.

"Aeronautics will be not only the means of producing happiness to the majority of men, but will also cause to bring forth new principles for the better government of all nations.

"The great question has always been to annul space. Our organization composed of heavy matter chained us to the ground. Incessant and unconscious efforts have gradually broken one by one the links of that chain, and whenever one of them has been destroyed, we feel ourselves more free and more apt to attain superior planes of existence. With dirigibles and aeroplanes not one link of that chain but many links have been broken at once.

"There is not a single science, there is not a single institution that will not feel the powerful influence of aeronautics. Legislation is bound to change. Commerce will receive such an impetus that what you need will be brought instantaneously from the antipodes to satisfy the smallest caprice.

"If there is a natural law that tends to make human kind a unit in the world, aeronautics will do more for its fulfillment than all covenants celebrated by nations to this end.

"I do not want to enlarge on this subject which no doubt is present in a clearer way in your minds.

"I shall content myself in greeting you from the bottom of my heart, because you have devoted yourselves to a fruitful task, exposed to all kinds of hardships and even to death, that others may enjoy better conditions of life. The importance of men depends on the means they have produced for the benefit of the greater numbers. From this dictum, if it is true, you may draw the conclusion of the allotment that belongs to you."

From Senator Carroll S. Page, Chairman Committee On Naval Affairs, U. S. Senate

"WE have seen what was accomplished by this service in the late war, but at best it was but a faint forecast of its possibilities in warfare.

"I believe there is a great field for this service in the civilian and commercial world, and he is a wise man who dares to limit its development along these lines.

"Wishing your work the best of success."

From Senator Morris Sheppard

"I REGARD the importance of aviation as beyond measure, and its future possibilities are practically limitless. It is the one great and all important movement of the future to which Congress and the American people should immediately give the most careful and painstaking attention."

From Congressman John J. Esch

"AS modern aeronautics started in America and received through the Wright brothers its greatest impetus, the United States should take a leading part in all movements seeking to develop aerial navigation.

"I wish the Congress a most successful session."

Message from Hon. Josephus Daniels, Secretary of the Navy

"I SEND my greetings. It is a matter of congratulation that our Navy has made some world records in aviation and I am confident that we are just upon the threshold of greater achievements in aviation development and better than that aviation is to become not only an integral and important part of the military service, but is to come into large use for civilian purposes."

Message from Major General Charles T. Menoher, Director of the Air Service

"I DESIRE to express to you my good wishes for the successful accomplishment of the Third Pan-American Aeronautic Congress and Exposition and hope that it will lead to the attainment of excellent results in connection with the promotion and development of commercial and military aeronautics."

From Congressman Augustus O. Stanley

"I AM pleased to see the interest manifested in aeronautics in military and civilian activities. In my humble opinion the mastery of the air is the mastery of the world. I share the almost universal hope that differences between nations may never again be determined by physical force. It is, however, almost beyond a rational hope that our children and our children's children shall be forever immune from the horrors of war, and if we are again involved in a world-wide conflict, those who command the air will determine the issue in my humble opinion.

"The aeroplane is an American invention and aeronautics offer a most inviting field to the unrivalled genius of America. I heartily felicitate you on the organization of this league and take this occasion to express my most ardent hope that your most laudable endeavor may be crowned with complete success."

From Senator James W. Wadsworth, Jr.

"I MAY be charged with being a dreamer, but I honestly believe there is scarcely any limit to the development of this new method of transportation. It will be a case of 'go as far as you like.'"

Message from John Barrett, Chairman Pan-American Union

"UPON my return from an extended trip west, I am replying to your valued letter of May 7th, inviting me to be a guest at the official luncheon of the Aerial League of America, to be held at the Hotel Traymore, Atlantic City, to-morrow, and to deliver an address on that occasion.

"First, I desire to thank you most sincerely for the honor you do me in extending to me this invitation, and were it possible I would most certainly accept. As it is, other engagements which I made before I heard from you will prevent my presence.

"As you are good enough to intimate that you would desire some message from me in the event that I could not be with you, I am glad to say that I believe that one of the most practical and progressive influences for the kind of Pan-Americanism that we are now trying to develop will be the comprehensive extension of flying routes and facilities all over Latin-America. There is no part of the world where aerial transportation of passengers, mail and express can accomplish more good than in a majority of the countries of Central and South America. Their peculiar physical formation and their intermingling high mountains and low-lying valleys make a demand and provide an opportunity for aerial navigation that, properly cared for, will be a most potent factor not only in developing the resources, commerce and population of these countries, but in putting them into closest touch with the men and business of the United States.

"There is no more direct way of developing trade and friendship than through travel and close acquaintance. The new methods of aerial transportation which are now being evolved will cause thousands of representative Americans to visit Latin-America and, in return, bring corresponding numbers of Latin-Americans to the United States. The problem, moreover, of mails and fast express will be easily solved under these new conditions.

"Every part, for example, of the long range of the Andes Mountains, reaching for nearly 5,000 miles, the length of South America, and the now inaccessible portions of the Amazon, Parana, Magdalena and Orinoco Valleys will be made readily approachable and opened to legitimate exploitation. In short, it is difficult to place any limit upon the potentialities of aeronautics in Latin-America.

"As one who has devoted twenty of the best years of his life to the cause of Pan-Americanism, I rejoice with all my heart in the possibilities for aerial navigation in promoting practical Pan-Americanism."

THE NEWS OF THE WEEK

Honeymoon Trip By Air

Boston, Mass.—A honeymoon trip in the clouds has been arranged by Edward A. Terhune, Jr., of Cambridge. He has built a special two seated biplane for his bride, formerly Miss Gladys Thompson, daughter of Mr. and Mrs. James G. Thompson of Brookline. They will leave Boston making stops at Springfield, New York and Atlantic City. Mr. and Mrs. Terhune announced their marriage recently, but delayed their honeymoon trip until the aeroplane could be completed. He was a naval aviator during the war and is now General Manager of the Eastern Aircraft Corporation.

Goodyear to Establish Passenger Service

The first dirigible passenger line in the United States will be established between Akron, Ohio, and Detroit, Michigan, within the next two months by the Goodyear Tire & Rubber Company, according to plans just announced.

This announcement followed the purchase by Goodyear of a large dirigible from the French Government. The airship is 260 feet long, has a capacity of 320,000 cubic feet of hydrogen and will have accommodations for 30 passengers.

This new ship, which will be capable of a speed of 55 miles an hour, is already on its way to America and will arrive in Akron before the end of May.

It is estimated that a month will be required to assemble the dirigible at the company's large aviation field near the Akron factories and that daily trips will be made over the 150 mile distance between the two cities. A four-hour schedule will probably be maintained at the inauguration of the line.

Passengers and freight will be carried between these two important Middle West cities for the purpose of demonstrating the practicability of the lighter-than-air craft in commercial airway transportation. Later it is probable that the dirigible will be used between the Akron and Toronto factories of the Company.

Navy Flying Station Now Proposed for Great Salt Lake

Energetic attempts are being made by Navy officials and prominent citizens of Salt Lake City to have the Bureau of Navigation establish a Naval Air Station on the Great Salt Lake near Salt Lake City. It is proposed that the operating site for aerial observation and experiments with Navy planes be made at Lakeside, near Farmington. However, two other possible locations have been studied, which lie within the immediate vicinity of the Farmington site.

Rigid Hangar for Pacific Coast

The Navy Department has completed arrangements with the War Department for the erection of a permanent hangar to accommodate rigid dirigibles on North Island, San Diego, Calif. The matter depends upon funds being available to the Navy Department for this purpose. With the purchase for the Navy of the great dirigible in England accommodations on both coasts are imperative. For this one ship there will be available only the hangar the Navy is erecting at Lakehurst, N. J.

Aerial Service at Asbury Park, N. J.

The De Luxe Air Service, Inc., has been formed at Asbury Park, N. J., for the promotion of aerial transportation and commercial aviation. A field has been leased near the Hollywood golf links, Asbury Park, as headquarters, and operations are to begin early in June. Several new Canadian Curtiss planes have been purchased, and plans are under way for the construction of a modern four-machine hangar.

Lieut. Stuart A. Morgan, chief pilot of the company, with H. A. Steiner, Walter Steinback, of the Steinback company, Asbury Park, and Charles D. Winters are the promoters of the enterprise.

Only army aviators will be engaged as fliers, three of those already selected having seen service with the American army, abroad. They are Lieut. Harold A. Steiner, Lieut. Ted Parsons and Lieut. Frank Turner. Lieut. Arthur McAleenan, Jr., was an army instructor.

The company will welcome all aerial travelers to their field, which will be plainly marked as per government regulations for identification. Offices of the company are located in the Kinmonth building, Asbury Park. Daily passenger flights will be made, and aerial transportation of merchandise and mail also will be undertaken. It is hoped to eventually establish a passenger and express line along the Atlantic coast, with the local field as one of the important links in the chain. Two or three passenger machines only will be used this summer.

To Use Aeroplane in Campaign

A. C. Townley, president of the National Non-Partisan League, is the first nationally-known politician to adopt the aeroplane as a part of his campaigning apparatus. He has placed an order for a Curtiss Oriole with W. A. Kidder of Minneapolis, Minn., president of the Curtiss Northwest Airplane Co. He expects to make new records in delivering campaign speeches over a wide territory. The plane will accommodate three passengers and the passenger compartment will be fitted with a typewriter table. "The aeroplane is making a strong bid for the place formerly occupied by the automobile as a favored method of transportation for politicians," said Mr. Kidder.

Official Luncheon at Hotel Ambassador, Saturday, May 22nd, of Army and Navy Officials and Delegates attending Third Pan-American Aeronautic Congress and Exposition, among whom were Lt. Col. J. D. Carmody, Lt. Col. H. M. Hickam, Lt. Commander J. C. McCay and Mrs. McCay, Mr. Alan R. Hawley, Chairman Contest Committee of the Aero Club of America, Major Thomas S. Baldwin, A.E., Chief of Inspection Division, Lighter-than-Aircraft, U.S.A., Mr. Henry Woodhouse, Vice-President Aerial League of America, Mr. S. P. Leeds, President of Atlantic City Chamber of Commerce, Mr. Harry B. Cook, Secretary of Atlantic City Aero Club, Lieutenants Cuching and Heines, U.S.N., who flew the large Navy F-5-L boat from Rockaway to Atlantic City to attend the Congress as Navy representatives, Mr. Augustus Post, Secretary of the Aero Club of America, Mr. William Hoppin, Vice-Consul of Chile, Capt. Horace Keane of the New York Aerial Police, Lieut. R. B. Quick, Mr. W. H. Logue of Baltimore, Mrs. Pollock, Major Granville A. Pollock, Miss F. Winfield, Mrs. Wm. Allen Bartlett of New York, Mr. Mark Ovendon, Secretary of the Executive Committee, Miss Marvel, Captain Hugh L. Willoughby, Mr. Harry Burton of the Associated Flying Clubs of Ohio, Mr. Roy W. Ammel, late of the Peruvian Air Service, Mr. and Mrs. T. W. Hellman, Captain W. A. Gibbons, Mr. Teeron and Mr. R. C. Fisher of the U. S. Rubber Co., Mr. L. L. Irvin, inventor of the Irvin Air Chute and Mrs. Irvin, Sergt. Major Brotrell, Expert Army Parachute Jumper, Lieut. Lamb, U.S.N., and Sergeants Blake and Bergeron who flew from Mitchel Field to the Congress

Landing Fields Being Secured in Georgia

The Commanding Officer of Souther Field, Americus, Georgia, advises that an effort is being made to obtain municipal fields throughout the state of Georgia. Letters have been sent to over one hundred cities and towns in the state, requesting the establishment of municipal fields. These letters contain a description of a field which would be suitable for aviation purposes, and a questionnaire is attached to be filled out and returned. So far fifteen cities in the state have been heard from and all of them have expressed a willingness to establish landing fields; and in some cases assistance is asked of the government. It is intended to make an effort to visit all points which have municipal landing fields or which contemplate establishing municipal fields to chart them for future purposes.

Ives with the Fairchild Aerial Camera Corporation

Dr. Herbert E. Ives, lately Major in charge of the Experimental Department, Photographic Branch, U. S. Air Service, (author of "Airplane Photography") has joined the Fairchild Aerial Camera Corporation, as consulting engineer.

Dr. Ives has had extensive experience in scientific research, in the Bureau of Standards and other prominent laboratories. He is well known for his contributions to optical and photographic science, and his experience along these lines will be of particular value in insuring the scientific excellence of the apparatus put out by the Fairchild Aerial Camera Corporation.

In addition to his pre-war experience, Dr. Ives had unique opportunities during his army service to learn at first hand of the problems and methods employed in aerial photography on the American, English, French and Italian fronts. The results of Dr. Ives' study of the subject are set forth in his recent book "Airplane Photography."

Technical Instructor for Aerial Police

The New York Aerial Police are adding a technical staff to the force. Prof. Harry J. Marx of the College of the City of New York is the first recruit, ranking as captain and will give a series of engineering lectures on aeronautics similar to the courses at the college. This work will be considered as one of the qualifications for commissioned officers' rank.

Captain H. J. Marx, has spent the last five years in the aeronautical field, both with the U. S. Government and also as engineer for the Standard Aircraft Corporation. He has been with the City College since the courses were first organized and has been an enthusiastic worker in developing these courses.

Preparations have been made to conduct tests of all kinds, for which purpose the laboratory facilities of the college are at their disposal.

Flying School Extends Its Service

On June 1st the Philadelphia Aero-Service Corporation will start a branch of its flying school at West Chester, Pa., on Greystone, the country estate of P. M. Sharples. Mr. Sharples has arranged for this service so that some friends interested in flying may secure the thorough training given by the Philadelphia School at a point near their homes. At the same time it is not the intention to limit the students at this point to acquaintances but others residing in the vicinity may avail themselves of this opportunity to learn flying.

Arrangements have also been completed with Mr. R. K. Musselman of New Holland, Pa., a graduate of the school, whereby students in the vicinity of Lancaster may secure their primary training from Mr. Musselman and take their advanced work at the Philadelphia School.

Over one hundred and fifty students have been enrolled for the summer season and two classes have already qualified and secured their pilot's licenses this Spring.

The school honors have now passed to W. N. Hudson of Berkley, Va., who was soloed on May 11th after 137 Minutes instructions. Like most students Mr. Hudson is so enthusiastic about his training that he proposes taking an advanced training course before trying for his Expert's License.

Bellanca Manufacture Curtailed

The Maryland Pressed Steel Company's announcement, in our advertising columns, will occasion a wide-spread regret at the palpable necessity of the company's Aircraft Department, to curtail, for the present at least, their manufacturing operations.

This course has been determined upon by reason of labor and other conditions still ruling in the engineering industry of France and after continued abortive attempts to arrange a guaranteed supply of engines of an extent necessary to meet the demand for the Bellanca Two-Seater that has followed publication of the results of drastic tests in flight and stunting.

Harry E. Tudor, Sales Manager, of the Aircraft Department, had successfully consummated a forceful selling campaign and recorded a large number of orders. Some hundreds of prospective buyers of Bellancas will share in Mr. Tudor's regret at the Maryland Pressed Steel Company's enforced decision and will undoubtedly look forward to an early adjustment of the difficulty in ecquiring engines and the re-appearance of the Bellanca on the market.

New York Awaits Action of Federal Government for Aerial Laws

Albany.—The New York State Legislature adjourned without taking action on the proposal that it enact legislation providing for the appointment of a commissioner of aeronautics and a code to govern air flights until the Federal Government formulates regulations to cover the entire country.

Governor Smith sent in a special message asking for a law which would sanction the appointment of an aeronautics commissioner who would have supervision over the building of aerodromes and hangars, who would sanction all activities in the air such as licensing pilots and craft and who would direct the formation of an aerial militia as well as an aerial patrol for waterways.

The Senate and Assembly then passed a resolution which said in effect that the Legislature felt the need of aerial laws but believed such statutes should be national in scope and that the Federal Government should take the initiative.

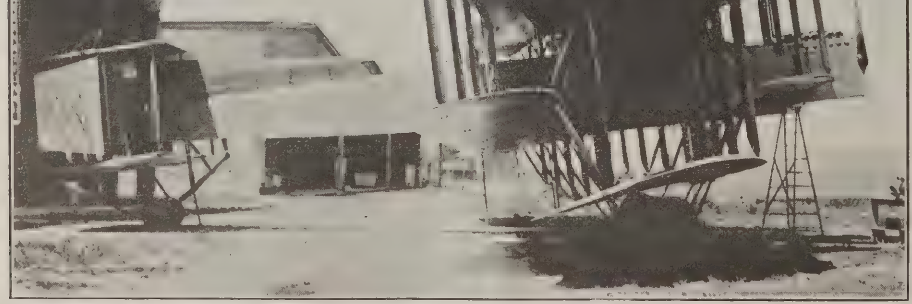
Aeroplanes in Arizona to Transport Freight

It is proposed to use an aeroplane to transport asbestos fiber to the railroad at Rice, Arizona, from mines that are far back in mountains considered too rugged for the building of a wagon road. The plane is to have capacity for a ton or more of freight and is expected to make several trips a day at small cost of operation. An aeroplane has been used in Yuma county for examining lands that were to be bought or leased from the State while an enterprising mine owner at Dome provides a twenty-mile aeroplane ride from Yuma for prospective investors in his stock.

Surgeon Flies to Patients

Baltimore.—Asked to hurry to Cambridge Hospital, where many surgical cases had accumulated, Dr. Robert M. Lewis, of this city, flew with pilot Philip E. Easter in a Curtiss F flying boat, equipped with a Curtiss OXR-6, 100 h.p. engine, from the landing stage at River View Park. Fifty-five minutes later he was in Cambridge, Md.

By taking the air route he beat the train and boat schedule by about four hours. He likewise established a record for having been the first Maryland surgeon to answer a hurry call by a flying boat.



Multi-plane being assembled at Langley Field, Va., for test. It is equipped with three Liberty motors. Two propellers one pusher and one tractor © International

The AIRCRAFT TRADE REVIEW

Curtiss Wasp in Bolivia

The Curtiss Wasp aeroplane has added another chapter to its interesting aviation history.

According to word received from Julio de Zamoro, Bolivian minister of war, the Wasp recently made history in Bolivia, being the first machine ever to fly in that country and the first flight in the world from such a high altitude.

Word received by C. W. Webster, supervisor of Latin-American sales for the Curtiss Aeroplane and Motor Corporation from La Paz, Bolivia, stated that the Wasp, piloted by Donald Hudson, made its first flight with complete success, apparently flying under the same conditions as exist at sea-level.

With the exception of the high altitude wings, the Bolivian Wasp is the same machine as that used by Roland Rohlfs in establishing a new world's altitude record on September 18, 1919—a performance which still remains an official world's record. The machine was delivered to the Bolivian government last year and is the first military aeroplane owned by that government.

Aviation in Bolivia has heretofore been held back on account of the high altitude of that country. The aerodrome, located a short distance from La Paz, the capital, is 13,000 feet above sea-level and is the highest in the world.

First Inter-City Aerial Service for Passengers

The first American inter-city airplane passenger service to be run on a regular schedule over an established route, will begin operations within the next three weeks, when the California Aerial Transportation Company of Stockton starts its new Curtiss Eagle on daily flights between Los Angeles and San Francisco.

The valley route will be followed, with stops at Bakersfield, Fresno and Stockton. The schedule will include, for the present, three trips in each direction a week. Six passengers may be carried on every flight. Further expansion of the service is to be determined by the results of the first few months. If conditions warrant, more of the multi-engined planes will be obtained and a regular daily service installed.

Aero Club of Syracuse, Inc., Taken Over By Syracuse Aero Corporation

The Syracuse Aero Corporation recently incorporated in Syracuse has taken over the property and equipment formerly owned and controlled by the Aero Club of Syracuse, Inc.

The new corporation has started operations with three planes. It has a very complete equipment; a hangar that will house seven ships, gas and oil station and a very large landing field offering an adequate landing place.

The corporation plans to carry passengers, express, do advertising and photographic work. The corporation also offers the use of its landing field and facilities to any pilots passing through.

Hammond Opens Chicago Office

Lee Hammond has opened offices in the Boulevard Bldg., 30 N. Michigan Ave., Chicago. Associated with him are John Hammond and Nimmo Black.

They are placing on the market new X-5 motors and have established service at a Chicago flying field, whereby a pilot can have his motor replaced by a new one in a few hours. They are also handling new and used Canadian and D planes and expect to place on the market very shortly a special two-passenger plane.

Successful Commercial Flight

With their front cockpits filled with merchandise, two Curtiss motored Standard J-1 airplanes which took off from Roosevelt Field at Mineola arrived at Minneapolis after a stop of 30 hours at Buffalo because of adverse weather conditions. The pilots were R. S. Miller and Charles S. Keyes, members of the Curtiss-Northwest Airplane Co.

R. E. Plimpton, Formerly of S. A. E., Joins Sales Agency

Raymond E. Plimpton, formerly publication manager and field secretary of the Society of Automotive Engineers, has joined the Wales Advertising Company of New York. He will devote his time primarily to the handling of advertising campaigns of a technical and semi-technical nature.

He was for three years assistant engineer of the General Vehicle Company, Long Island City. After a year as assistant editor of *Power,* he was appointed Publication Manager and Field Secretary of the Society of Automotive Engineers, which position he held for three years.

During the war Mr. Plimpton was an automotive engineer in the Motor Transport Corps at Washington.

Personal Pars

L. Clayton Hill has opened offices in the Holden Building, Detroit, where he will maintain an organization to engage in the general practice of consulting engineering, specializing in automotive subjects. Hill was associated with the Packard Motor Car Co. for eight years, first in the chassis design work, and later held the position of body engineer and aeroplane engineer. After leaving the Packard Company, Hill became connected with Captain Lepere in the Franco-American Engineering Co. During the war he was associated with the French Aviation Mission under Captain Lapere, designer of the Lapere plane.

James A. Edwards, who was formerly aeronautical engineer with the Hall-Scott Motor Car Co., San Francisco, Cal., has accepted a position as assistant engineer in the engine laboratory of the Associated Oil Co. of California, Oakland, Cal.

Robert Potter Breese, who during the war was officer in charge of the engineering department of the Air Service at Hazelhurst Field, Mineola, has joined the engineering staff of the Loening Aeronautical Engineering Corp. of New York.

Williams-Hill Flying Circus

The Williams-Hill Aeroplane Company of Arkansas City, Kansas, have established a landing field in that city and have secured five Curtiss and Curtiss Standard machines for passenger carrying, exhibition and flying circus work during the season of 1920. The flying personnel of the company includes thoroughly experienced pilots. The plans for the coming season are comprehensive and interesting.

The Flying Circus of the Williams-Hill Company at Arkansas City, Arkansas

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, General Superintendent, Air Mail Service
Herbert Blakeslee, Assistant Superintendent
John A. Jordan, Chief of Construction

J. Clark Edgerton, Chief of Flying
Charles I. Stanton, Chief of Supplies and Maintenance
Carleton A. Parker, Assistant Chief of Maintenance
George L. Conner, Chief Clerk
John A. Willoughby, Operator in Charge of Radio Experiments

Eugene Sibley, Operator in Charge of Radio Maintenance and Operation

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt
Frederick A. Robinson
Walter J. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris

Duard B. Colyer, Acting Superintendent, New York-Washington Division
Samuel F. Doane, Superintendent, New York-Cleveland Division
Walter H. Riddell, Superintendent, Cleveland-Chicago-Omaha Division
E. W. Majors, Superintendent of Repairs, Bustleton, Pa.
Eugene J. Scanlon, Manager, Air Mail Warehouse, Newark, N. J.
Paul W. Smith, Manager, Newark, N. J.
Maurice J. Kelly, Manager, Bellefonte, Pa.
Howard F. Salisbury, Manager, Cleveland, O.
Andrew R. Dunphy, Manager, Chicago, Ill.
William I. Votaw, Manager, Omaha, Neb.

PILOTS

Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen
Elmer C. Nichols
John J. McLaughlin
Harry Huking
Glenn V. Conrad
Irving Murphy
Claire K. Vance
Homer W. Johnston
William N. DeWald
Clarence C. Lange
William C. Hopson
W. J. McDonough
D. A. Martin

Omaha Aerial Mail Makes Fast Start

Chicago—An aerial mail aeroplane carrying 200 pounds of letters arrived in Chicago from Omaha in five and a half hours. The plane was piloted by D. Wald.

Ray Benedict made the flight from Chicago to Omaha, inaugurating the first Westward extension of the aerial mail service from Chicago. The service will be maintained daily except Sundays and holidays.

Aerial Mail to Use Caproni Planes

Washington.—Fifteen Caproni biplanes, equipped with two tractor engines and one pusher engine, will arrive in this country shortly from Italy and will be turned over to the Post Office Department by the Navy Department for use in the Air Mail Service. These aeroplanes were purchased by the Navy for war purposes and are being turned over to the Post Office under legislation passed by Congress and authorizing the transfer of aviation equipment from the War and Navy departments to the Post Office Department.

The Caproni planes, when equipped with three Liberty engines, will have a total of 1200 h.p. per plane and will be capable of carrying 2700 pounds of mail each for five and one-half hours. These planes have a wing span of 76 feet 9½ inches. Fully loaded and including gas and oil, they will weigh 13,137 pounds and their speed is set at 105 miles per hour.

UNITED STATES POST OFFICE DEPARTMENT

NEW YORK-CHICAGO ROUTE—AIR MAIL SERVICE

Monthly Report of Operation and Maintenance, March, 1920

Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	SERVICE AND UNIT COST						
													Gallon of Gasoline	Total Time Run		Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
														hr.	min.				
39A	$9.80	$3.15	$102.41	$38.17	$24.96	$94.22	$16.65	$43.87	....	$75.00	$124.61	$532.84	35	1	45	200	5.7	$304.50	$2.66
43	32.20	1.75	102.41	38.17	24.96	94.23	29.50	20.51	....	7.60	124.61	475.94	115	3	06	200	1.7	153.54	2.38
48	73.92	4.90	102.41	38.17	24.96	94.23	66.93	27.65	....	28.20	124.61	585.98	264	7	02	400	1.5	83.34	1.46
65	103.83	13.70	102.41	38.17	24.96	94.23	113.24	111.06	$225.00	50.00	124.61	1,001.21	370	11	54	814	2.2	84.12	1.23
66	241.10	38.59	102.41	38.17	24.96	94.23	291.82	333.52	109.92	50.00	124.61	1,449.33	852	30	40	3,100	3.6	47.28	.47
67	85.84	12.09	102.41	38.17	24.96	94.23	143.85	88.28	....	50.00	124.61	764.44	317	15	07	1,124	3.5	50.58	.68
72	340.09	43.12	102.41	38.17	24.97	94.23	279.61	362.36	148.60	50.00	124.61	1,608.17	1,210	29	23	2,635	2.2	54.72	.61
74	50.00	7.82	102.41	38.18	24.97	94.23	12.69	389.25	2,551.90	50.00	124.61	3,446.06	170	1	20	90	.5	2,584.56	38.29
76	171.96	32.16	102.41	38.18	24.97	94.23	275.17	450.82	221.60	50.00	124.61	1,586.11	646	28	55	2,799	4.3	54.84	.57
79	56.99	7.20	102.41	38.18	24.97	94.23	8.72	238.00	165.45	50.00	124.61	910.76	200	0	55	75	.4	....	12.14
88	420.29	59.41	102.41	38.18	24.97	94.23	570.33	273.20	123.20	50.00	124.61	1,880.83	1,392	59	56	5,486	3.9	31.38	.34
89	162.58	27.23	102.41	38.18	24.97	94.23	186.20	159.44	735.95	50.00	124.61	1,705.80	579	19	34	1,825	3.2	87.18	.93
91	163.90	24.03	102.41	38.18	24.97	94.23	132.43	268.79	1,853.76	50.00	124.61	2,877.31	625	13	55	1,290	2.1	206.76	2.23
94	....	....	102.41	38.18	24.97	94.23	....	198.10	26.80	50.00	124.61	659.30	......	......		......	......	......	.....
98	....	....	102.41	38.18	24.97	94.23	....	170.62	1,593.21	50.00	124.61	2,198.23	......	......		......	......	......	.....
101	231.74	31.60	102.41	38.18	24.97	94.23	300.86	262.45	618.45	50.00	124.61	1,879.50	758	31	37	2,945	3.9	59.46	.64
102	181.80	19.78	102.41	38.18	24.97	94.23	184.77	457.20	15.46	50.00	124.61	1,293.41	661	19	25	1,618	2.4	66.60	.80
103	....	....	102.41	38.18	24.97	94.23	....	89.08	50.00	50.00	124 61	573.48	......	......		......	......	......	.....
104	12.04	3.15	102.41	38.18	24.97	94.23	4.76	144.95	11.50	50.00	124.61	610.80	43	0	30	50	1.2	....	12.22
105	321.74	58.33	102.41	38.18	24.97	94.23	520.10	237.44	156.40	50.00	124.61	1,728.41	1,144	54	33	5,189	4.5	31.68	.33
107	281.68	44.05	102.41	38.18	24.97	94.23	263.12	281.12	46.35	50.00	124.61	1,350.72	996	27	39	2,465	2.5	48.84	.55
201	28.00	14.00	102.41	38.18	24.97	94.23	62.92	175.13	4.50	200.00	124.61	868.95	100	6	31	415	4.2	133.32	2.09
202	47.60	8.40	102.41	38.18	24.97	94.23	....	234.02	4.50	200.00	124.61	878.92	170	......		......	......	......	.....
204	....	....	102.41	38.18	24.97	94.23	....	230.27	86.10	200.00	124.61	900.77	......	......		......	......	......	.....
206	....	....	102.41	38.18	24.97	94.23	....	219.10	4.50	200.00	124.61	808.00	......	......		......	......	......	.....
44302	7.00	1.40	102.42	38.18	24.97	94.23	3.97	59.00	3.35	35.00	124.61	494.13	25	0	25	20	.8	....	24.71
44305	13.60	3.06	102.42	38.18	24.97	94.23	9.52	28.40	....	3.85	124.61	442.84	45	1	00	60	1.3	442.84	7.38
Total	$3,037.70	$458.92	$2,765.09	$1,030.79	$674.13	$2,544.20	$3,477.16	$5,553.63	$8,756.50	$1,849.65	$3,364.47*	$33,512.24	10,717	365	12	32 800	3.1	$91.74	$1.02

Cost per mile, overhead, $.30; cost per mile, flying, $.21; cost per mile, maintenance, $.51.

Note: Plane No. 39-A, Curtiss HA, equipped with Liberty 12 motor.
Planes Nos. 43 and 48, Curtiss R4, equipped with Liberty 12 motors.
Planes Nos. 65 to 107, inclusive, De Havilands, equipped with Liberty 12 motors.
Planes Nos. 201 to 206, inclusive, Martins, equipped with two Liberty 12 motors.
Planes Nos. 44302 and 44305, Curtiss JN4D, equipped with Curtiss OX5 motors.

*Includes $378.69, covering work preliminary to the inauguration of service between Chicago and Omaha.

OTTO PRAEGER, Second Assistant Postmaster General.

THE EXHIBITS ON THE STEEL PIER AT ATLANTIC CITY

THE exhibits of machines and aeronautic equipment on the Steel Pier, Atlantic City, at the Third Pan-American Aeronautic Exposition aroused great interest. Following are brief descriptions of some of the exhibits.

The Navy Exhibit

The U. S. Navy exhibit comprised an F5L Flying Boat, with twin Liberty engines; Hall-Scott, Curtiss, Renault and Fiat motors; various types of propellers; scale models of various naval seaplanes; radio apparatus, etc.

The F5L, constructed by the Naval Aircraft Factory at Philadelphia, has a span of 107 feet, wing chord of 8 feet, and an overall length of 50 feet.

Two 400 H.P. Liberty engines are used, connected to tractor propellers 10′ 6″ in diameter. 500 gallons of gasoline are carried, sufficient for a duration of 10 hours at full speed, near sea level, and a speed of 102 M.P.H. is maintained.

Fully loaded the machine weighs 14,000 lbs. This weight includes a crew of 5 men; 1 Davis and 4 Lewis machine guns; 4 230 lb. bombs; radio apparatus; telephone system with 6 stations; carrier pigeons and 500 gallons of gasoline.

The machine is exhibited with one half covered and the other half exposed to show the interior construction.

In the making of this machine there are 6,000 distinct pieces of wood, 50,000 wood screws, 46,000 nails, braces and tacks, and 4,500 square feet of cotton fabric. The hull requires 600 square feet of veneer. The 250 pieces of steel tubing total 1,000 feet in length. 5,000 feet of wire and cable, 500 turnbuckles, 1,500 each of bolts, nuts and washers, and 1,000 metal fittings are necessary in the construction of this flying boat.

Aircraft Sales Corporation Exhibit

The Aircraft Sales Corporation exhibited the following machines: Norman Thompson flying boat, Martinsyde biplane, De Havilland No. 9, Sopwith Coupe and twin-motored Handley Page biplane. Also the following motors: B. E. 2 type, Sunbeam-Puma type, Rolls-Royce Hawk types, Wolseley-Viper type, B. R. 2 type, Cosmos-Dragonfly type, a Fiat 300 h.p., a 80 h.p. Le Rhone and a 300 h.p. Hispano-Suiza.

The Norman-Thompson flying boat is equipped with a 210 H.P. Wolseley-Viper engine, has an air speed of 85 miles per hour and a touring speed of 50-55 miles per hour. The span of the top plane is 48′ 4″, bottom plane 37′ 6″; maximum height 10′ 8″; overall length 27′ 4″; fuel capacity 500 lbs.; weight fully loaded 2,800 lbs.

The Martinsyde Scout is a single seater with Rolls-Royce Falcon 250 H.P. engine. Its maximum speed is 145 m.p.h. with a landing speed of 45 m.p.h. The weight empty is 1,710 lbs. and fully loaded 2,280 lbs., and it has a tank capacity of 43 gallons. The span of the top plane is 32′ 9″, bottom 31′ 2″; overall length 25′ 5″ and maximum height 10′ 4″.

The De Havilland No. 9 is a two-seater tractor with 240 H.P. Siddeley engine. It has a speed of 110 at 10,000 feet and a landing speed of 57 m.p.h. It has a span of 42′ 5″; maximum height 11′ 2″; overall length 30′ 10″; weight empty 2,200, fully loaded 3,890; tank capacity 74 gallons.

The Sopwith Snipe is a single seater tractor with B.R.2 200 H.P. engine. It has a speed of 121 miles at 10,000 feet. The span is 31′ 1″; overall length 19′; maximum height 9′ 6″; weight loaded 2,020 lbs.

The Twin-motored Handley Page is equipped with Rolls-Royce Eagle 350 H.P. engines. The maximum air speed is 95 miles per hour and the cruising speed 65-70 m.p.h. The span is 100 feet (with wings folded 31 feet); overall length 64 feet; maximum height 33 feet; weight empty 8,000 lbs.; with full load 13,000; tank capacity 300 gallons.

The J. L. Aircraft Corporation Exhibit

The all metal monoplanes of the J. L. Aircraft Corporation aroused much interest.

As the J. L. 6 aeroplane has been especially designed for passenger traffic unusual attention has been given to the construction and arrangement of the passenger and pilot's cabins. The pilot's compartment is arranged for two people and is fitted with dual control mechanism so either person can act as pilot.

The passenger cabin is entirely enclosed with suitable windows in the sides and in front, and it is fitted with two large comfortable bucket type front seats, and an especially wide rear seat which holds three persons, making the normal cabin capacity five persons. The cabin has large doors on either side affording easy entry and exit for the passengers.

The interior of the cabin is luxuriously upholstered with very comfortable cushions and arm rests and all modern accessories, such as would be found in high class limousine cars. All seats are fitted with safety belts and the floor is so arranged as to provide comfortable foot rests.

The windows in the sides of cabin are arranged so they can be lowered to admit fresh air, if desired. There is also a large space provided for baggage, access to which is by means of a hinged rear seat cushion. By means of a suitable window in the front of cabin the passenger can observe the principal instruments on the pilot's dash, such as revolution, height and speed indicators.

Owing to the construction of the wings they are easily and quickly removed and replaced (can easily be done in 20 minutes) and as no truing up is reouired this can safely be done by any mechanic, thus making storage easy.

The landing chassis is especially designed for commercial aeroplanes and is made with shock absorbing devices in all four load carrying struts, thus making landings as free from harm to the machine as possible, and as the wheels are located well forward there is little danger of the machine nosing over, if landing on soft ground.

Specifications

Span	48′ 6″
Length Overall	31′ 6″
Height on Top of Cabin	10′ 2″
Motor	6 cylinder, 185 h.p., 1400 rev.
Cabin Capacity	6-8 persons, including pilot
Weight of Machine Empty, including cooling water	2245 pounds
Gross Weight	3895 pounds
Fuel Capacity, at full speed, fully loaded	6-7 hours
Fuel Capacity, at most economical speed, fully loaded	10 hours
Landing Speed, fully loaded	50 miles per hour
Average Speed	112 miles per hour, at 12,000 ft. altitude, fully loaded
Climbing Speed	12,000 feet in 35 minutes, fully loaded

Twin-engined Handley Page Biplane of the type exhibited at the Third Pan-American Aeronautic Exposition

INDUSTRIAL DEPARTMENT

Oakland, Cal., Has Many Aeroplane Engine and Parts Manufacturers

OAKLAND (population, 1919, 225,000) is situated on the continental side of San Francisco Bay. With Berkeley and Alameda it makes up the leading industrial center of California. Oakland is the county seat of Alameda County, which in 1919 had a population of about 400,000, of which 330,000 resided in immediate proximity to the bay shore.

In Oakland are the termini of five transcontinental routes—the Union Pacific-Southern Pacific, Santa Fe, Western Pacific, the southern route via New Orleans, and the northern route via Seattle. Also in Oakland are the Pacific Coast Termini of the Lincoln Highway, transcontinental motor road, and of the valley route of the California highway system.

Oakland is also a seaport, ships docking alongside the railroad terminals. Vessels sail from her to Pacific coast points—San Diego, Los Angeles, Portland, Seattle, Vancouver and Alaska ports—and to Hawaii, the South Sea Islands, Australia, China, Japan and the Philippines. River boats also ply to Sacramento, Stockton and other interior points. This section of the western coast is highly esteemed for manufacturing because of (1) climate, which is productive of the maximum of output and the reduced cost of plant construction because of the absence of extremes of heat and cold; (2) high order of labor supply, from both the standpoint of intelligence and physical fitness; (3) factory land at reasonable prices alongside of rail and water shipping facilities and, (4) lower cost by 15 per cent. in plant construction than in neighboring parts of California.

Electricity, generated by water power in the Sierra Mountains, is almost the only power used. The rates are the lowest in the United States. In 1914 the installed horsepower totaled 13,368; in January, 1919, one electric corporation alone had installed more than 40,000 horsepower in industrial plants—kilowatt hours of electric energy consumed by Oakland industries increased more than 400 per cent. between January 1914 and January 1919.

Cost of living is from 20 to 25 per cent. less than in Atlantic States, according to official reports of the Department of Labor.

Following is a list of manufacturers of aeroplane parts and accessories:

Aviation Engines and Parts.

Union Gas Engine Co., Oakland, Cal.
Hall Scott Motor Car Co., Inc., 5th Street and Snyder Avenue, Berkeley.

Engines.

Atlas Imperial Engine Co., Foot 19th Avenue, Oakland.
Standard Gas Engine Co., Dennison and King Streets, Oakland.
Oliver Manufacturing Co.. Fourth and Madison Streets. Oakland.
Columbia Gas Engine Works, 1106 13th Avenue, Oakland.

Engine Parts.

California Foundry Co., 1101 22d Avenue, Oakland.
Boyer Machine Co., 2323 Foothill Place, Oakland.

Grinding Aeroplane Cylinders and Connecting Rods.

Scoville Machine Works, 3403 Piedmont Avenue, Oakland.
Pacific Spring Bed Co., West Berkeley, Cal.

Propellers.

Jacuzzi Brothers, 2034 San Pablo Avenue, Oakland.

Aluminum.

Aluminum Products Co., 4th Avenue and 11th Street, Oakland.

Brass, Aluminum and Bronze Small Parts.

Automatic Electric Faucet Co., 2135 Oregon Street, Berkeley.

Brass and Bronze Castings.

Standard Brass Casting Co., 600 3d Street, Oakland.
California Foundry Co., 1001 2nd Avenue, Oakland.
Oakland Brass Foundry Co., 928 23d Avenue, Oakland.
Pioneer Brass Foundry, 976 23d Avenue, Oakland.
Peerless Foundry Co., Oak and Clement Streets, Alameda.
R. S. Young Supply Co., 517 4th Street, Oakland.

Stampings, Nuts, Bolts and Pins for Aeroplanes.

American Coin Register Co., 4065 Hollis Street, Emeryville.

Steel Castings.

Best Steel Co., Foot 105th Avenue, Oakland.
Judson Mfg. Co., Emeryville, Cal.

Wireless Telephone Parts

Magnavox Co., 2725 East 14th Street, Oakland.

Aeroplane Pattern Workers.

Anderfuren & Brown, 419 3d Street, Oakland.

Waterproof Clothing.

Gold Medal Waterproofing Co., East 12th Street and 25th Avenue, Oakland.

Metal Aeroplane Parts.

Kawneer Mfg. Co., 8th Street and Dwight Way, Berkeley.
B. W. Norton Mfg. Co., 720 Market Street, Oakland, Cal.
K. A. Davis Mfg. Co., 165-67 13th Street, Oakland.

Castor Oil.

Ozmo Oil Refining Co., 2d and Bristol Streets, Berkeley.

Sweaters and Caps.

College Knitting Co., 3136 Grove Street, Berkeley.

Combination Overall Suits.

Sibbett Mfg. Co., 1301 7th Street, Oakland.

Gloves.

Western Glove Co., 1010-12 Jefferson Street, Oakland.
Busby Glove Co., 1905 Adeline Street, Oakland.
Columbia Glove Co., 1110 Broadway, Oakland.
M. W. Hodkins Co., 1115 7th Street, Oakland.

University of California at Berkeley, showing the Sather Campanile in the center

AERONAUTIC INSTRUMENTS

General Principles of Construction, Testing and Use

By MAYO D. HERSEY

THE life-cycle of any aeronautic instrument starts with the recognition of some distinct physical measurement that has to be made in flight; then, broadly speaking, it passes through the three main stages of construction, testing and use; and ends by revealing the need for some particular improvement or new development, at which point the cycle begins over again.

As a convenient way of arranging the available information, we will consider in succession these different stages or processes, emphasizing only the general principles involved, but illustrating the latter by their application to particular instruments such as the aneroid barometer or tachometer.

Construction of Instruments

In classifying instruments with regard to the purpose for which they are needed a fundamental distinction may be drawn between service instruments and experimental instruments. The former class, seen in Figs. 1, 2 and 3, includes only the usual instruments forming a permanent part of the equipment; the latter class includes special instruments, usually with self-recording attachments, for use in experiments on aircraft and especially for conducting performance tests on aeroplanes. Service instruments have to be light and rugged, fool-proof and reliable under all conditions of flight, and must not occupy too much space in the cockpit. Experimental instruments must be extremely accurate and the self-recording feature is desirable, but there is great latitude in attaining these ends.

A further distinction may be drawn between instruments for balloon and airship use, and those for aeroplanes. Historically, instruments for lighter-than-air craft were the first to be developed; witness for example the origin of the aneroid barometer for aeronautic use in France in 1798. But owing to the more extensive use of aeroplanes during the war, the scientific elaboration of aeroplane instruments stands now far in advance of airship instruments. The chief characteristics of airship instruments are the relatively lower range of speed and altitude over which the mechanism has to function accurately, and the correspondingly weaker forces available to operate the movement. In addition there are some extra instruments needed on airships for measuring conditions relating to the air and hydrogen supply.

Finally all aircraft instruments, whether for service or experimental use and whether for lighter-than-air or heavier-than-air craft, may be classified with respect to the nature of the measurement made. From this viewpoint the most important groups are: first, altitude instruments; second, speed indicators; third, direction indicators; fourth, tachometers; fifth, gasoline indicators; sixth, thermometers and pressure gauges for the power plant; seventh, time-pieces; eighth, oxygen apparatus; ninth, additional instruments for lighter-than-air craft.

Altitude Instruments

Taking up these nine groups in order, altitude instruments broadly considered may be regarded as covering the following species:

(*a*) Altimeters.
(*b*) Barographs.
(*c*) Thermographs and aerographs.
(*d*) Statoscopes.
(*e*) Rate-of-climb indicators.
(*f*) Night altitude indicators.

The *altimeter* is in principle a common aneroid barometer with a moveable altitude scale instead of a fixed-pressure scale. For aeroplane use, however, the aneroid has to be made uncommonly well; otherwise the instrument will have serious errors caused by the peculiar conditions of flight, and the pointer may vibrate so much that it can hardly be read. The writer had his first opportunity to go up in the air and to observe the performance of aneroids under flight conditions at the Annapolis meeting of this Society in 1913. A barograph and a 3-inch surveying aneroid were taken along for that purpose. Altimeters made their first appearance during the subsequent year and the other aeroplane instruments rapidly followed.

A typical altimeter is seen in the upper left-hand part of the instrument board picture, Fig. 1. The elements of its construction are probably familiar, comprising a stiff steel spring coupled to a thin corrugated metal vacuum box, together with a delicate transmission mechanism which multiplies the movement of the box. A dilation or contraction of the box only 0.002 or 0.003 inches causes a motion of 1 inch at the tip of the pointer. Various minor adjustments are provided, and usually a bimetallic bar forms part of the lever system, serving in some measure to compensate for the influence of temperature.

Barographs usually contain a tier of vacuum boxes, one on top of another, from two to five in number, with a pair of steel springs inside each box. The multiplying factor of the transmission mechanism is decidedly less than in altimeters, so that the pen arm has correspondingly greater power for tracing a firm ink line on the revolving chart.

Thermographs are intended for recording the temperature of the atmosphere at different altitudes. They have been built both with bimetallic elements and with delicate Bourdon tubes containing mercury or ether. For performance testing of aeroplanes direct-reading strut thermometers are more commonly used. *Aerographs* are combination recording instruments comprising hair hygrometer for humidity determination along with the barometric and thermometric elements.

Statoscopes serve to tell whether a balloon or airship is slightly ascending or descending. They are remarkably sensitive, too much so to be of much use on aeroplanes. The statoscope in its simplest form is a thermally-insulated vessel of air, connected to the external atmosphere by a glass tube containing a drop of red liquid which moves freely one way or the other in response to any minute change of external pressure. In another form the drop of indicating liquid is replaced by a sensitive metallic diaphragm and lever system.

Rate-of-climb indicators give a direct reading of the vertical speed in feet per minute. The most usual types are based upon the pressure difference set up between the two ends of a capillary tube connecting a thermally-insulated air container with the external atmosphere. What is actually observed is the manometer indication of that differential pressure. At first liquid manometers were used, but later a purely mechanical type involving sensitive diaphragms was developed by the Bureau of Standards.

The *night altitude indicator* is an optical projection instrument of the range-finder type, particularly valuable for seaplanes flying low over the water.

Speed Indicators

Turning to the second general group, speed indicators may be subdivided somewhat as follows:

a Air-speed indicators, pressure type.

b Pressure heads for airspeed indicators.

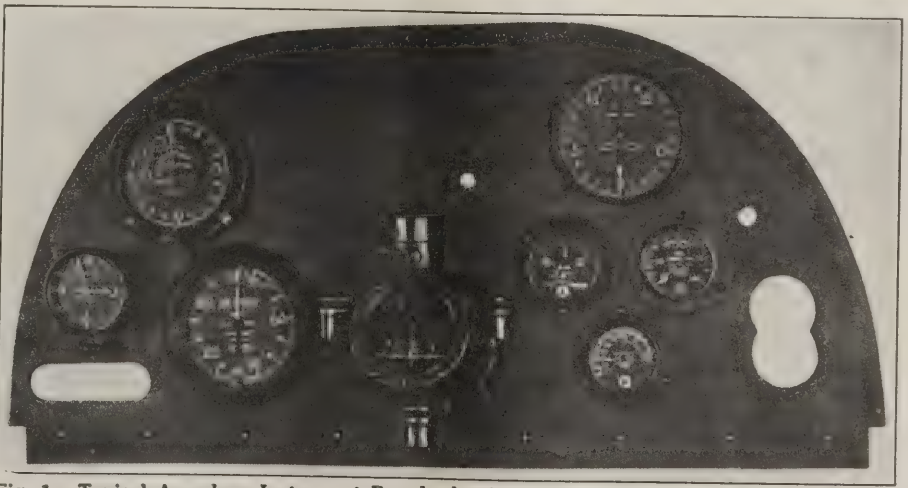


Fig. 1. Typical Aeroplane Instrument Board, showing Altimeter, Timepiece, Air-Speed Indicator, Compass, Tachometer, Pressure Gages and Radiator Thermometer

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Paper presented at the Spring Meeting, St. Louis, Mo., May, 1920, of The American Society of Mechanical Engineers.

c Air-speed indicators, anemometer type.

d Ground-speed indicators.

The *pressure type of air-speed indicator* shows the impact pressure of the air due to the motion of the aircraft and so enables the pilot to keep above his stalling speed and below the danger point due to excessive speed. It does not show the true speed relative to the atmosphere, except near sea-level unless a subsequent calculation is made to allow for the change in the air density with altitude. Such instruments consist of two parts: the indicator proper which is mounted on the instrument board in the cockpit (See Fig. 1), and a nozzle or pressure-head mounted out on some strut where it will catch the full force of the undisturbed atmosphere going by. The indicator part measures the differential pressure generated by the pressure head and transmitted to it through some length of tubing. Liquid manometers were used for the indicator early in the war, but later were superseded by various diaphragm constructions. Not only corrugated metal diaphragms, but even rubber and doped silk have been found satisfactory. The pressure difference acting on the diaphragms of an air-speed indicator is far less than in the aneroid barometer, but somewhat greater than in the rate-of-climb indicator. As a general principle it is of course easier to develop a satisfactory mechanism when there is a large force available to actuate it, that when the force is small, on account of the difficulties of eliminating friction.

The pitot tube and venturi tube have been tried out in a great variety of forms as *pressure heads for air-speed indicators.* A combination of the two gives the greatest differential pressure and was adopted in this country in preference to the pitot tube, in order to accelerate production of indicator mechanisms during the war. Neither this combination nor the venturi by itself claims any scientific superiority over the familiar pitot tube. Figure 2 shows the particular style of pitot-venturi adopted as standard by the Army. It generates a differential pressure of about 31.5 in. of water at 100 miles per hour near sea level, which in numerical magnitud is about 6.4 times the pressure given by a pitot tube.

Air-speed indicators, anemometer type (or true air-speed type), are usually based on some rotating vane or Robinson cup principle and connected, either directly or through electric transmission, with a tachometer movement. They are more useful than the pressure type for navigation, but even so require a previous knowledge or conjecture as to the wind velocity in order to determine the ground speed.

Absolute, or ground-speed indicators have been successfully made in the visual type which gives its result by combining an observation of the angular velocity of the line of sight with a knowledge of the altitude. Some form of instrument is needed, however, which does not depend on the visibility of the ground.

Direction Indicators

The third general group, direction indicators, may be subdivided as follows:

a Compasses and turn indicators.
b Inclinometers and banking indicators.
c Angle-of-attack indicators.
d Side-slip or yaw indicators.
e Drift indicators.
f Course-finding instruments.

Compasses may conceivably be either magnetic or gyroscopic, but the latter have not yet been successfully developed for aeroplanes. Magnetic compasess in common use are of the short-period type. A long-period type was favored by many practical pilots because of its virtues as a turn indicator, but is no longer produced. Both liquid-damped and air-damped compasses exist, and of both the flat card and vertical card constructions. *Turn indicators* have been made in both aerodynamic and gyroscopic forms. The former type measures the differential pressure between two static heads placed one at each wing tip. It is therefore a purely atmospheric instrument which might read zero if the aircraft were resting in a large portion of the atmosphere itself undergoing rotation. The gyroscopic forms show absolute rotation: one type is a very sensitive indicator showing whether the aircraft is or is not turning, and whether to the right or left, while the other type is somewhat less sensitive but actually measures the rate of turning.

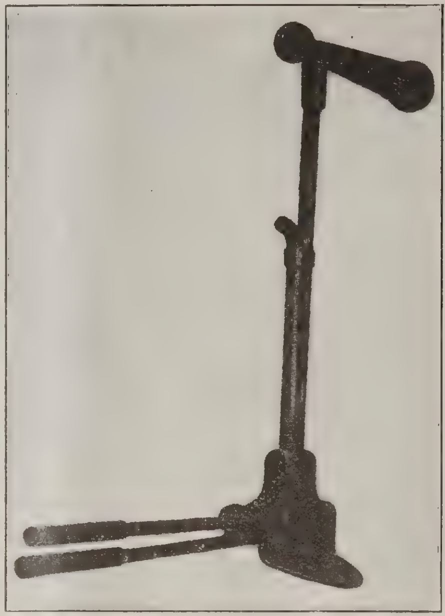


Fig. 2. Pilot-Venturi Pressure-Head for Air-Speed Indicator

Inclinometers are to be distinguished from banking indicators in that they measures the inclination of the aircraft to the ground, while *banking indicators* show only the departure of the aircraft from the proper banking position. Except for unaccelerated flight, inclinometers can only be correct if they operate on some gyroscopic principle. Gyroscopic inclinometers, whether of the simple spinning-top variety or some other, are usually of the long-period-pendulum type. They function just as a simple pendulum might if it were several thousand feet long, and so are free from the effects of transient accelerations, but not from persistent acceleration in the same direction, as with continuous flight in a circle. The most common inclinometers are liquid-filled tubes in the form of a large, triangular closed circuit, and are used for fore and aft observations. When the aircraft climbs upward, the liquid seeks its level, and the liquid rises in that part of the tube which is nearest the pilot, so that the movement of the meniscus can be read on a scale. The commonest form of banking indicator is a modification of the familiar spirit-level, bent into an arc of about 20 deg. each side of the zero. Mechanical pendulum types also are in use.

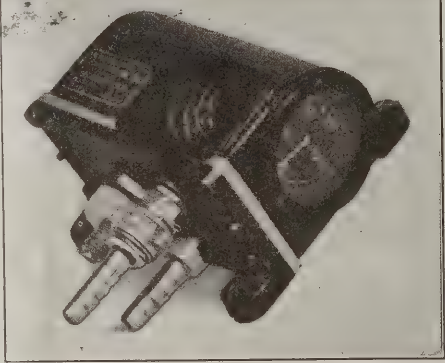


Fig. 3. Aviator's Oxygen Regulator

Angle-of-attack indicators show the angle between the wing chord (say) and the direction of motion. Both weather-vane and differential-pressure types have been used, the latter like the side-slip indicator below.

Side-slip or yaw indicators show whether the aircraft is heading exactly in the direction of motion (relative to the atmosphere) or not. If the banking indicator does not show zero it can be inferred that side-slipping or skidding must exist, but this instrument is direct acting. It operates by the differential pressure set up between symmetrically placed openings on the two sides of a sphere. This sphere is attached to some strut so as to head directly forward. Evidently if the force of the air comes sideways, due to yaw, more pressure will be set up in one orifice than in the other. The two openings are connected to the two sides of a diaphragm movement with dial and pointer.

Drift indicators show the speed of drift compared to the speed of advance and involve the rotation of some reference line by the observer until it is parallel to the apparent trajectory of objects going by on the ground.

Course-finding instruments as made at present are not direct-acting physical instruments but merely mechanical devices for determining the course and distance made good, by reference to data already available.

Tachometers

Tachometers constitute the fourth general group. All the various types serve for the sole purpose of indicating the revolutions per unit time of the propeller shaft, with the exception of one instrument which indicates also the angular acceleration of the propeller shaft, that is, its rate of speeding up or of slowing down. The diverse types of construction may be subdivided as follows:

a Chronometric.
b Centrifugal.
c Magnetic
d Electric.
e Air-viscosity and air-pump.
f Liquid.

The *chronometric* or clock-work type, which is the most accurate but also the most complicated, actually counts the number of revolutions that take place in a fixed time interval.

The *centrifugal* type, now the most commonly used on aircraft, works on the principle of the change in position of a revolving mass due to centrifugal force acting against the restoring force of a spring.

The *magnetic* type operates by the rotation of a permanent magnet near an electrically conducting disk which is mounted on the pointer spindle and controlled by a spring. By virtue of induced currents.

the magnet exerts a force tending to drag the disk around, thus deflecting the spring by an amount depending on the speed of rotation of the magnet.

The *electric* type consists of a magneto, geared to the engine shaft, which transmits the resulting voltage to a millivolt meter in the cockpit which is graduated to read directly in revolutions per minute.

The *air-viscosity* type is similar to a torsion viscosimeter. Any such viscosimeter measures the product of viscosity by speed of rotation. Here the viscosity of the fluid, air, is so nearly a constant that the deflection of the spring and pointer is almost directly proportional to the speed of rotation. The *air-pump* type is based on the force of impact of the air against a movable vane resisted by a spring; the pump is geared to the engine shaft so that the deflection depends on the speed of rotation.

The *liquid* type involves the observation of the maximum height of a liquid column or deflection of Bourdon gage which can be maintained by a centrifugal pump geared to the engine shaft. By comparing the height of this column with that of a similar one heavily damped an indication of angular acceleration is also obtained. Several of the above physically different types of tachometers are each found in a variety of mechanical modifications.

Gasoline Indicators

Gasoline indicators, the fifth group, comprise broadly speaking depth gages and flow meters. *Depth gages* show the available gasoline supply or volume and are of two types, those based on a simple float principle and those which measure the hydrostatic pressure near the bottom of the tank. The latter form permits the indicator part to be mounted in the cockpit. *Flow meters* show the rate of consumption of gasoline at any instant. They have been based on the venturi principle and also on the principle of utilizing the force of impact of the stream of liquid against a movable element resisted by a spring or by gravity.

Thermometers and Pressure Gages

The sixth group comprises thermometers and pressure gages for the radiator, the lubrication system, and the gasoline tank, respectively. These thermometers are of the long-distance transmission type with liquid-filled or vapor-filled bulbs. The indicator movement, installed in the cockpit, consists essentially of a Bourdon tube element, as do also the air and oil pressure gages.

Time Pieces

The seventh group, time pieces, presents no great novelty aside from the reversing stop-watches used in connection with certain bomb sights; but they have to be rugged enough to withstand airplane service and provided with suitable dials.

Oxygen Apparatus

Oxygen apparatus for the aviator, group eight, may be either of the compressed oxygen, liquid, or chemical type. Only the first has been put into regular use in this country. These outfits are provided with automatic regulators which control the flow of oxygen from the storage tank to the aviator's breathing attachment. The regulators are dsigned to deliver an amount of oxygen which increases at the higher altitudes in accordance with a prescribed formula. The mechanism is operated by diaphragms. An example of such a regulator is shown in Fig. 3

Balloon and Airship Equipment

The ninth and last group comprises balloon and airship equipment not already included among the foregoing. Special pressure gages are made for indicating the amount of water ballast carried. Delicate manometers are made for measuring the air pressure in the balloonets and the hydrogen pressure in the envelope; liquid types have been used, but sensitive diaphragms are better. Electric resistance thermometers are used to indicate the temperature of the gas in the envelope. Hydrogen detectors based on the action of osmotic pressure are valuable for locating leaks.

Government Instrument Collection

Examples of practically all the foregoing types and some others are to be found in the government collection of aeronautic instruments, which is maintained by the Bureau of Standards at Washington. This collection is now one of the most complete in the world. It contains instruments of French, British, Italian, Russian, Swiss, Danish, Dutch, German, and Austrian manufacture as well as American.

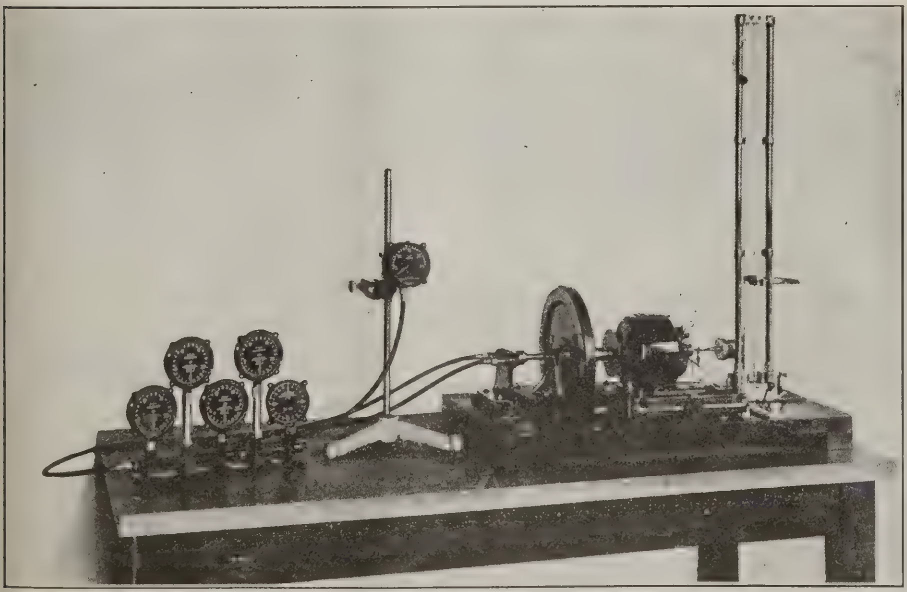


Fig. 4. Testing outfit for aeroplane Tachometers

Design, Development and Production

The design of aeronautic instruments is at present almost wholly on a cut-and-try bases. The Bureau of Standards has made some progress, however, in placing instrument design on a rational basis. Consideration has been given to such general problems as: the stiffness of elastic systems where two bodies such as a spring and diaphragm are coupled together; the effects of temperature and elastic lag on coupled systems; bimetallic bars for temperature compensation; the balance of moving parts to resist angular acceleration and vibration; the securing of a uniform scale by suitable design of transmission mechanism; and the treatment of aerodynamic problems and the general action of damping fluids by the method of dimensions described before this Society by Dr. Buckingham at the Buffalo meeting in 1915 in his paper on Model Experiments. There is hardly space here even to outline those results, which it is hoped may form the substance of later communications.

Experimental development has to follow the preliminary design of an instrument before it can be put into quantity production. It is here that the physical laboratory, in immediae conjunction with an instrument shop suitably equipped with watchmaker's tools in addition to the ordinary machine tools, plays an essential part. Among the recent development projects of the Aeronautic Instruments Section at the Bureau of Standards may be mentioned the following, several of which were undertaken at the request of the Air Service or the National Advisory Committee for Aeronautics:

a The conversion of barographs from a low-altitude to a high-altitude range by the addition of a suitable external spring, together with the development of recording processes to eliminate the use of ink.

b The conversion of altimeters from an altitude scale to a pressure scale by the modification of the mechanism and engraving of special dials, so as to adapt them for aircraft performance testing. In connection with this work improvements were also made in the method of mounting the main spring of commercial altimeters so as to diminish the observed differences between readings with increasing and decreasing altitudes, or hysteresis as it is commonly called.

c The development of a precision altimeter with a large dial giving a ¼-in. movement of the pointer for each 100 ft. of altitude. In order to justify such high precision of reading, that is, such high sensitivity or openness of scale, a special design had to be made for the elastic system to diminish elastic lag. This was accomplished by making the steel main spring so many times stiffer than the diaphragm that the resultant action of the instrument is practically independent of the quality of the material in the diaphragm.

d The development of a direct-reading, rate-of-climb indicator based on the capillary-tube-leak principle, but in which the use of a liquid has been entirely dispensed with through the use of sensitive diaphragms.

e Development of a reduced-scale working model of a proposed gyro-stabilizer on the long-period pendulum principle, possessing mechanical features of extreme simplicity.

(*To be continued*)

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Apart from a small supply of cants from riving operations no timber was ever delivered on any of these four cost-plus contracts. Yet these contractors received $19,000,000. Independent contractors furnished more than enough logs and lumber to meet all the demands of this country and of our Allies long before these cost-plus contractors learned the job or were ready to produce logs (pp. 1394-1395).

The Vicious Cost-plus System.

Col. Disque's cost-plus spruce contracts were direct invitations to premeditated waste and extravagance because they permitted cost-plus profits on everything from a 100 per cent profiteering mackinaw sale (p. 568) to miscellaneous "welfare work," and soldiers' "accident policies" to protect men from the dangers of forests and mills in Oregon (p. 3809). "Cost plus" on every operation and every article from steam shovels, on the thirteen railways being constructed under Col. Disque, down to dishpans in the cook shanties. The larger the expense the greater was the profit. Civilian pay, illegally given soldiers working for cost-plus sub-contractors on the Lake Crescent Railroad, paid by the Government, thus became subject to an additional 7 per cent rake-off. A part of the civilian pay supposed to have been received by soldiers was never paid to them, according to the testimony of intelligent witnesses like Mallery (pp. 1076-1080) and Lipps (p. 2424). Gross, a newspaper man, testified to the same general effect (p. 2398). Enlisted or drafted for military duty, these men were placed under a system of military peonage in cost-plus operations.

Disque's Unused Spruce Railways

Col. Disque's cost-plus contracts were in keeping with his "spruce" railways, of which thirteen were built at a total cost of $9,845,106.07 for 139 miles of logging roads (p. 1593).

Maj. Hitchcock, who appears to have been in charge of operations in Oregon under Col. Disque, wrote letters—found on pages 3440 and 3441—without authority of law, directing the Warren Spruce Co. to build two logging roads costing $3,639,826; one of 23½ miles and the other of 10.83 miles, with two miles of sidetrack, according to the Spruce Production "Report on possibilities of utilizing properties," where exact status of constructed roads is presented. These two roads, built at a total average cost of approximately $105,000 per mile for logging roads, not counting sidings, tell their own story. Maj. Hitchcock also directed other roads to be built without authority.

A letter to the committee from J. P. Murphy, "general counsel" for the Spruce Production Corporation (p. 3439), describing the only authority for building these railways by the Warren Spruce Co., says:

> Article 1. In addition to engaging in riving operations, as in said contract provided, the contractor shall also engage in logging and milling operations and other activities incidental thereto covering any kind of timber designated by the contracting officer.

The "general counsel" says, in explanation of the paragraph quoted:

> It was under this provision of contract No. S. P. D. 17-155, and general terms of both contracts, that said railways were constructed (p. 3439).

The foregoing illustrates the methods of Col. Disque and his associates better than any comment offered by witnesses who came before the committee.

On page 1593 of the record appears a statement of cost of logging roads as proposed to be constructed. The statement is assumed to correctly state the cost, and apparently represents the proposed mileage of the completed road, which, according to the "Spruce Corporation's report of actually built utilizing properties" (Exhibit No. 1, December 19, 1919), only reached 115.24 miles compared with 139.24 miles of the tabulated statement, which follows:

Cost of Railroads Constructed by Spruce Production Division and United States Spruce Production Corporation

No.		Mileage	Construction cost	Material furnished by Government	Total	Average per mile
1	Siems, Carey-Clallam Co.	36	$3,608,088.24	$358,624.53	$3,966,712.77	$110,186.46
	Airplane Spruce & Lumber Co.:					
2	Merrill & Ring	6.83	36,099.50		36,099.50	5,247.02
3	Quinault	5.96	445,427.69	29,984.48	475,412.17	79,767.14
4	Elle River	3.25	197,525.82	45,719.19	243,245.01	74,844.61
	Grant, Smith-Porter:					
5	North Nemah	9.11	388,664.75	46,047.40	434,712.15	47,718.12
6	South Nemah	3.90	75,015.91	52,623.85	127,639.76	32,728.14
7	Nosel River	2.06	40,492.20	9,368.52	49,860.72	24,204.23
8	Lewis and Clarke Narrow Gauge		20,468.50		20,468.50	
9	Lewis and Clarke	20.36	511,446.80	30,355.26	541,802.06	26,611.10
	Warren Spruce Co.:					
10	Toledo & Siletz	8.28	180,471.47	39,552.30	220,023.77	26,572.91
11	Yaquina Northern	15.66	1,443,931.29	109,734.04	1,553,665.33	99,212.34
12	Alsea Southern	25.99	1,899,632.25	186,528.73	2,086,160.98	80,267.83
13	Portland Lumber Co., Beaver Hill	1.79	86,770.08	2,533.27	89,303.35	49,890.13
	Total	139.24	8,934,034.50	911,071.57	9,845,106.07	70,706.01

Five Costly Logging Railways

A striking illustration of extravagance in construction appears in the foregoing table when Government logging roads Nos. 1, 3, 4, 11 and 12, built by three cost-plus operators, with an aggregate length of 77.71 miles (Spruce Report on Utilities, Exhibit No. 1, December 19, 1919), cost the Government a total of $8,325,194, or an average of nearly $107,000 per mile, while the remaining 37½ miles of Government roads were built at a cost of $40,000 per mile. This estimate is for main line of these logging roads and includes cost of sidetracks. However, no locomotives, cars or other equipment or terminal buildings, which are included in ordinary railway valuations of cost per mile, were bought or built for these roads. Expensive terminals, tunnels, bridges and other costly construction are common in the case of commercial roads. It will also be noted that, while the rights of way of most of these logging roads were largely donated or only cost a nominal figure, private commercial roads usually pay full value therefor.

(*To be continued*)

NAVAL *and* MILITARY AERONAUTICS

Navy to Increase Lighter-Than-Air Activity

The Navy Department has become keenly interested in the developments of dirigibles in Germany, since reports of the progress there have been laid before committees of Congress by Col. William N. Hensley, jr., U. S. A. Comdr. Jerome C. Hunsaker, U. S. N., of the Bureau of Construction and Repair, and member of the Joint Army and Navy Board of Aeronautics, has sailed for Germany on a mission for the Navy Department in connection with lighter-than-air craft. Three officials of the Zeppelin company are coming to the United States and are due to arrive May 24 to consult with the Navy Department and private interests on matters connected with the construction of lighter-than-air craft in this country.

Army and Navy Air Association

The annual election of officers of the Army and Navy Air Service Association has resulted in the choice of the following: President, Major Gen. Charles T. Menoher; vice presidents, Brig. Gen. William Mitchell, Col. A. L. Fuller, Col. M. F. Davis, Major Maxwell Kirby; treasurer, Lieut. Col. J. E. Fickel, all U. S. A. Assistant treasurer, Hiram S. Brown (former lieutenant colonel, U. S. A.); secretary, Earl N. Findley (former captain, U. S. A.); assistant secretary, Horace Green, major O. R. C. Chairman Board of Control, Col. Charles De F. Chandler, U. S. A.; member of board for one year, Comd. John F. Towers, U. S. N.; Cols. W. E. Gilmore and James E. Fechét, U. S. A.; A. B. Lamber (former major, U. S. A.).

Major C. C. Culver in Charge of Air Service Radio Work

Major Clarence C. Culver, Air Service, U. S. A., has been assigned as assistant executive of Air Service. Under direction of the Director of Air Service he will direct all matters pertaining to the control of radio activities within the Air Service. In radio matters affecting training and operations exclusively, Major Culver will function through the chief of Training and Operations Group; in matters pertaining to general control, he will function directly with the group chief concerned or the executive officer of the Air Service.

Navy Line Officers in Aviation Class

The Bureau of Navigation, Navy Department, in January last invited line officers of the U. S. Navy of seniority of the class of 1918 or above, U. S. Naval Academy, to apply for enrolment in a class in aviation at Pensacola, Fla. The applications were to be submitted by Feb. 15 and the class was to begin March 1. Because of a lack of personnel, it was necessary to delay the opening of the class until May 1. Sixty applications were received for enrolment in the class of twenty, and the following officers were selected and will report for instruction at Pensacola in this class: Lieut. Comdrs. J. H. Strong and Paul Cassard; Lieuts. O. O. Kessing, J. B. Kneip, J. S. Farnsworth, W. S. Hactor, Hugo Schmidt, R. E. Webb, W. Radford, A. C. McFall, K. McGinniss, E. L. Ericsson, L. E. Kelly, J. G. Farrell, G. L. Woolley, V. F. Grant, C. W. Wieber, F. C. Fechteler, F. B. Connell and J. L. Ballentine.

In addition to these schools, which are under the direct supervision of the Curtiss Aeroplane and Motor Corporation, the American Trans-Oceanic Company, Curtiss distributors for Greater New York and Florida, will operate a flying boat school at Port Washington, Long Island, under the general supervision of David McCullough, one of the pilots on the NC-3 trans-Atlantic flier.

Canada Enrolls New Air Militia

Ottawa.—Applications are coming in at the offices of the Air Board at the rate of fifty and sixty a day for enlistment in the new Canadian Air Force.

Preparations are already under way at Camp Borden, western Ontario, for the establishment of the first training camp of the force. There are adequate facilities there for the training of nearly three thousand men at a time. The equipment installed by the Royal Air Force at Camp Gordon has been taken over by the Canadian Government for the use of the Canadian Force.

The personnel will be drawn from volunteers from the ranks of ex-officers and airmen of the Royal Air Force resident in Canada. These will train at centers, which will be in operation all the year round, and officers and airmen enlisted in the new force will spend at least one month out of every twenty-four in active training, receiving pay and traveling expenses during their active period.

The force probably will be limited in the beginning to about five thousand, inclusive of all ranks. The organization of the force will be placed in the hands of Canadians who have had experience at home and on the war fronts in flying, and who are interested in building up a Canadian air militia.

Battleships Will Carry Speedy Scout Planes

Assignment of officers of the Pacific Fleet Air Detachment at San Diego to the superdreadnaughts New Mexico, Idaho and Mississippi will be made early next month, it has been announced aboard the aircraft tender Aroostook.

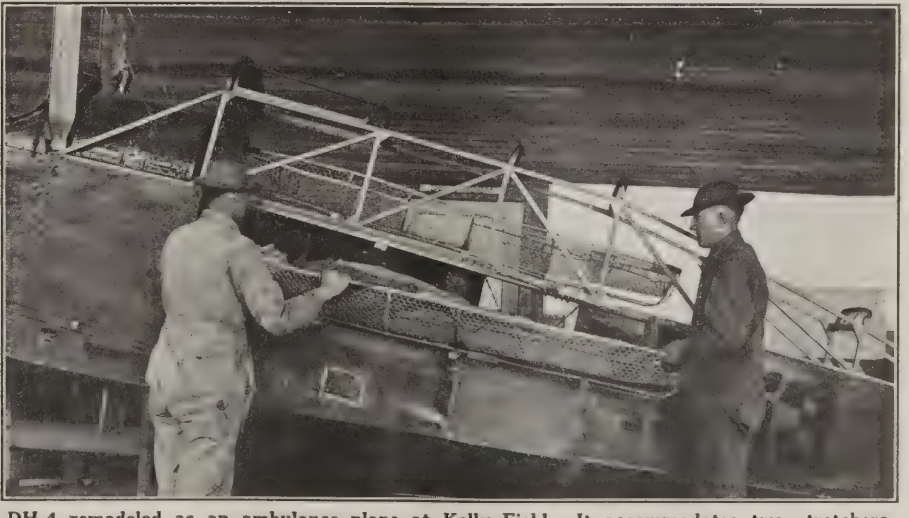
For the present three aviators will be assigned to each ship. Until the arrival of the Loening combat and observation planes in July, the officers who will pilot the aeroplanes aboard the three superdreadnaughts will fly Sopwith 1½ strutters, Sopwith Camels and Nieuports.

The Sopwith 1½ strutters are equipped with 140-horsepower Clerget motors. They are two-seaters, have a speed of 110 miles an hour and carry a radio outfit. The Nieuports, the first shipment of which is expected soon are fitted with 180-horsepower Gnome engines.

The Nieuport and Sopwith planes will be abandoned for ship work after the arrival of the new type Loening monoplanes late this summer. These planes are equipped with 300-horsepower Hispano-Suiza motors. The single-seater combat monoplanes have a speed of 150 miles an hour and the two-seater observation monoplanes between 140 and 145 miles an hour.

A modified type of Martin bomber, to be utilized as a torpedo-plane, also will be sent to San Diego this summer for the Pacific Fleet Air Detachment operations. The Martin torpedo planes carry a 21-inch Buiss-Leavitt torpedo weighing slightly more than a ton.

A Liberty R-type torpedo-plane, which arrived at San Diego from Philadelphia recently has been assembled by the Fleet Air Detachment. This plane which is to be employed in experimental and training work, is equipped with a 400-horsepower Liberty engine. The Liberty R torpedo-plane has a speed of 104 miles an hour and carries a 14-inch Whitehead torpedo weighing 1200 pounds.



DH-4 remodeled as an ambulance plane at Kelly Field. It accommodates two stretchers, which are inserted in the plane from opposite sides © Wengler

FOREIGN NEWS

British Plane Rises 13,999 Feet with 3,690 Pounds

A new British record has been established by a Handley Page aeroplane fitted with two Napier engines, of 450 horse power each. The flight lasted eighty minutes, and a record load of 3,690 pounds, equivalent to twenty-six passengers, was carried to a height of 13,999 feet.

Aerial Post in Belgium

A regular aerial postal service is to be established between Brussels and neighboring capitals. The first will be between Brussels and Paris, with three departures daily in each direction, namely, at 7 a. m., at 11.30 and at 5 p. m. Thus it will be possible to get an answer to a letter sent from one capital to another within 24 hours. The S.N.E.T.A. (Syndicat National pour l'Etude des Transports Aeriens) is to carry out the project. A surtax of 0.75 francs for each 20 grammes up to 100 grammes will be charged in addition to ordinary postal rates. Passengers will also be conveyed at a charge of not more than 300 francs, with free luggage conveyance up to 20 kilogrammes and 500 francs for the return journey.

Monaco Seaplane Meeting

The Monaco Seaplane Meeting terminated on May 2. The only machine which did the full course from Monaco to Bizerta, via Ajaccio, and thence to Tunis and back to Monaco, was one of the French Naval Air Service machines, piloted by Lieut. de Bellot.

As the naval pilots are debarred from competing for the prizes, the Grand Prix de Monaco has been awarded to Sadi Lecointe, who covered the longest distance of any civilian pilot in his Spad biplane. The highest speed attained in the trials was 222 kilometres (138¾ miles). One of the competitors in the Monaco-Bizerta race, M. Renaud, has not been heard of since he left Cagliari (Sardinia) for Bizerta on April 29. His seaplane was found in a broken-down condition by a British steamer northwest of Bizerta and towed into Algiers.

Aerodynamics Chair at the Imperial College

It is announced that Dr. Leonard Bairstow, C.B.E., F.R.S., has accepted the professorship of aerodynamics at the Imperial College of Science and Technology.

Dr. Bairstow is a fellow and a member of the Council of the Royal Aeronautical Society. He joined the Air Board in 1917, and was responsible, as technical adviser on aerodynamics, to Colonel Ogilvie, who was then in charge of the research department. He is a member of the Advisory Committee on Aeronautics, and of Lord Weir's Committee, and also a member of the Air Inventions Committee.

A Swiss-German Convention

It is reported from Berne that the Swiss Political Department is busily engaged in negotiations in connection with the drawing up of an aerial convention between Switzerland and Germany on similar lines to those recently concluded between Switzerland and France and Great Britain.

An Aerodrome in Bechuanaland

On his return to England to take up duty as South African liaison officer with the Air Ministry, Colonel van Ryneveld paid a tribute to King Kana of Bechuanaland, who had a complete aerodrome built at his capital at his own expense for the use of the aviators.

Colonel van Ryneveld said his three outstanding impressions were first, flying for hours and hours over a limitless sea; second, flying for miles and miles over the desert; and, thirdly, flying over vast tracks of virgin forest.

Their actual flying time from Brooklands to Cape Town was 109½ hours; they were only held up twice—once for ten days at Cairo, and once for twelve days in Bechuanaland.

Major Brand is to resume his duties as an officer in the R.A.F.

Bermuda Flying Boat Service

The above, which is being run by the Bermuda and West Atlantic Aviation Co., Ltd., will have shipped to them this week another of the Supermarine four-seater Channel type flying boats. This machine passed all its tests in a very satisfactory manner, and has been dismantled and is in process of packing in special crates for shipment to the Bermudas. With this consignment, there will be included a number of spare parts for these machines, which will enable a continual service to be maintained throughout the season.

Another London-Paris Service

Messrs. Instowes, the well-known shopping firm, are now competing with other aviation companies that run services between London and Paris. Vickers "Vimy" machines are being used in addition to their other craft, and the firm is only charging £12 for the single journey, or £21 return.

New Air Screw

A public demonstration is to be made shortly of a new type of air screw, the invention of an Australian engineer, states *The Times.* It is made on the turbine principle, both faces of the blades being fitted with a set of fins in staggered relation. Workshop tests have shown that for a given number of revolutions per minute the air speed produced by this propeller is, in comparison with that produced by the ordinary type, as five to three.

It is claimed that the turbine fins can be fitted to ordinary propellers by a simple metal attachment. The fins have the effect of giving the necessary extra strength required to act against any increase of lever-action on the leading edge of the blade.

Openings in Persia

From the recent report of the Anglo-Persian Military Mission, it appears that there should be openings for ex-flying officers and men of the R.A.F. in the new forces which are to be organized in Persia for military and police purposes. The equipment of the new Persian army is to include all the most modern ideas, and, of course, will include an air force.

Aircraft Advertisements

Handley Page Commercial Aeroplanes with advertisements painted on their great planes are now a familiar spectacle in South Africa and India. This new form of advertising is likely to become universally popular, as commercial flying develops in those countries.

An aeroplane displaying advertisements in huge brightly printed letters can be seen for a considerable distance, and when passing over a town the majority of inhabitants read the announcements.

Handley Page in China

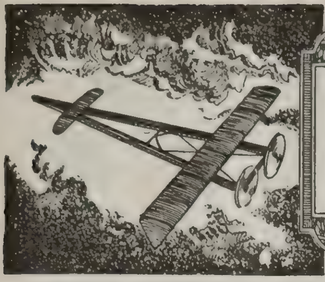
A flight in a Handley Page Aeroplane concluded the recent Railway Engineering Conference at Nanyuan, China, to illustrate to the delegates the simplest method of overcoming the transport problems which famed them on terra firma.

Sixty passengers went up in three flights. Fifty-one ladies also flew. The railway experts were greatly impressed by their flight in a gale and added to the findings of the Conference a recommendation that a passenger air service might be started between Pekin and Tientsin.

Commercial Aviation in Denmark

A company, under the style of Dankluftfartsselskab, has been formed in Denmark, and has demanded from the Government concessions to enable them to establish various aerial services. Their equipment includes 14 machines.

The Letord Biplane, equipped with 2 Liberty motors. Width 81 feet, length 45 feet



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon

Racing Type Flying Boat

Now that clear, warm weather is assured, model fliers will take up model aeroplane competition with renewed interest. The competitions in most cases will be held outdoors and many will be off water.

Water models furnish many thrills and are interesting to watch or fly because they must plane on the water until sufficient speed is attained when they leave the water and fly gracefully to heights of from 50 to 200 feet for perhaps 1,500 to 2,000 feet.

Longer flights than those mentioned above can be made, but owing to the heavy pontoons the flights are cut down somewhat. The resistance is greater as well and more power is consumed.

Some readers might wonder why I did not make a monoplane instead of the biplane to keep the resistance as low as possible. The answer is the biplane arrangement gives more lift to take care of the added weight and permits a very neat design because the boat is attached to the lower wing.

Boat Body

The boat body is 15 inches long, about 3 inches wide and 1 inch deep at its greatest dimension. The sides are cut from 1/32-inch birchwood or 1/16-inch balsa with partitions glued inside to strengthen the sides. The top and bottom sides must be covered with fibre paper or silk pasted on with waterproof glue and doped with regular aeroplane dope. About five coats would be sufficient with a finishing coat of valspar. The step in the bottom of the boat is to assist in getting it off the water. The suction is broken by this and allows the pontoon to lift off easily. In large boats they ventilate this; that is, a hole or space extends from the top to the bottom, allowing air to get in.

The two small wing floats are built up in the same way and are fastened to the ends of each wing as shown.

Wings

The wings are constructed much the same as those in preceding articles, but instead of two wing spars in each wing only one is used and less ribs to save weight. The ribs, however, are of the solid type and made from 1/32-inch birchwood or any other light weight wood with a good grain. The ribs are passed along the spars to the proper places and glued fast.

The upper wing has a greater spread than the lower one for stability. The wings are covered top and bottom with fibre paper or thin silk and doped well to protect them should the model land in water.

One interplane strut is used on each side of the wings. This can be wire or streamline bamboo fastened into each spar. At the center two struts are placed close together to permit the motor stick passing between and being fastened to it. The boat body is attached to the lower wing near the rear. Up in the nose or bow two bamboo strips are fastened to fasten the forward part of the body securely to the motor stick.

Motor Stick

The motor stick is a single stick of spruce ⅜ inch x 5/16 inch with a cross stick 10½ inches long, fastened to the rear end. Strips are then fastened to the ends to form a triangular shape for the tail which is covered with paper or silk and doped.

To the forward end a hook is fastened with thread and glue. This hook can be made from a heavy hair pin or other similar wire.

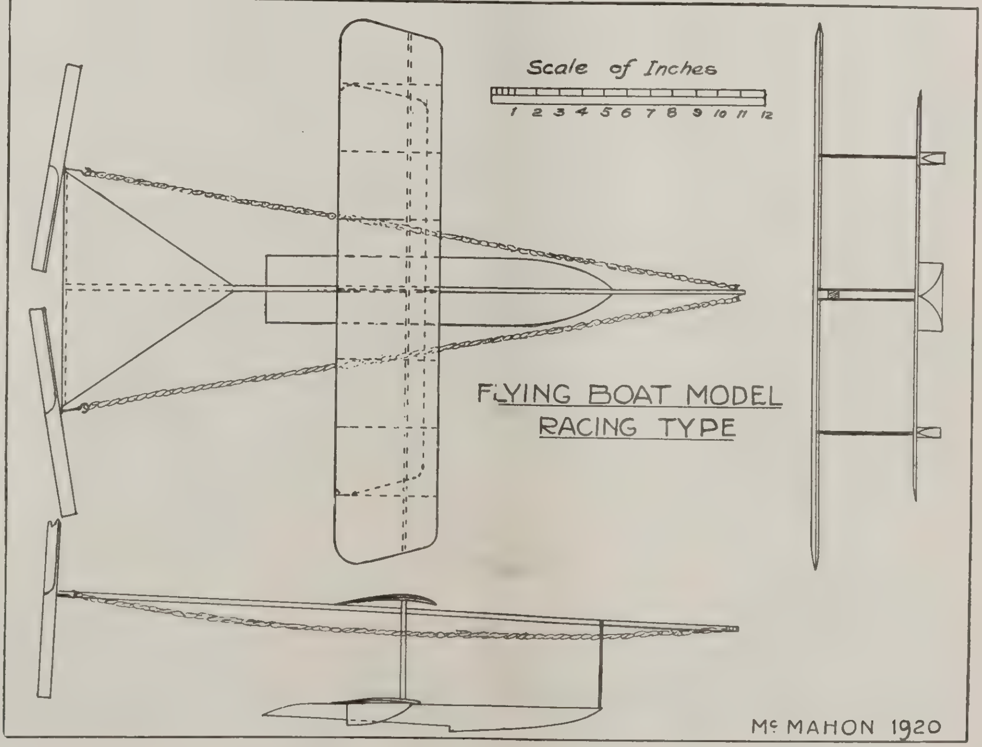
The propellers are cut from white pine and are of the regular racing type having a high pitch. They are 10½ inches in diameter and are driven by 14 strands of ⅛-inch flat rubber each.

I would advise the modelist to experiment with the model in order to find the correct number of rubber strands to use. Perhaps more will be needed to get the model off the water.

Two successful builders of model racing type flying boats are La Tour and Abst. The former from the Pacific Coast and the latter a member of the old Long Island Model Club.

These young men created records with their models both of which resembled the one shown here closely.

Line drawing of a Racing type Flying Boat description of which is given above



Aeronitis

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Their Nose Knows

Slick Aviator—How do you get so many girls?

Slicker Pilot—Oh, I just sprinkle a little gasoline on my handkerchief.—*Chaparral.*

Without Suspicion

Instructor to Cadet Class: This exam will be conducted under the honor system. Please take seats three apart and in alternate rows.—*Jester.*

Job for the K. P.

Major (excitedly): "General, the enemy are as thick as peas!"

General: "Shell them; you fool, shell them!"—*Trouble Buster.*

In Disguise

Pilot: What did you see at the movies last night?

Observer: Wallace Reid in "He was a Confederate, but he wore a Union suit!"—*Tar Baby.*

MAYOR HYLAN'S SKY COPS.

Courtesy N. Y. World

Private of Infantry (relating his story of a battle): "A piece of shell struck me in the head and knocked me senseless."

Private of Air Service (bored): "When do you expect to regain consciousness?"—*Trouble Buster.*

The Change Made the Difference

First Mech.: "His health has improved since he became a street car conductor."

Second Mech.: "Yes; perhaps the change did him good."—*Pitt Panther.*

Never Again

Fay—"I hope that I will never smell liquor on your breath again."

Aviator—"No, dear, you never will. Father has cut me off without a scent."—*Widow.*

Back to Cuba, Where the Red Noses Grow

A government bulletin states that during the past month almost one hundred aeroplanes have landed at a prominent Texas flying field en route to Cuba.

Gabriel Correspondence School

Lesson No. 5—Stunting

There are only two rules to remember in stunting: "Come out of the stunt before you get to the ground," is both of them.

Stunting was originally developed in the American Air Service to use in combat to outwit the Germans. However, it was never much used for this at Kelly Field. It is of great value now in dodging tax-collectors.

Looping

Suppose you are flying along on a level and suddenly remember you have left your ship's' nose-bag at the last gas station. You simply turn a loop, grab it and continue on your way.

In starting a loop, make a dive to gain your momentum. To be sure you dive enough, repeat "The Boy Stood on the Burning Deck" backwards.

(The historical fact that the boy "faced" the foe is of no value in looping). Having acquired the requisite jazz, try to count the number of hairs missing from where your bald spot is, or is expected. This throws your head back, your hand draws the stick toward your body and the ship starts on her loop. When the ground begins to come in view above your head you are near the top of the loop. When you look straight up into a well full of water and never see a drop splash out you know you are flat on your back. If you feel inclined to stay on your back, you should call a doctor—it might be rheumatism, but if it isn't rheumatism—well, you may need him anyway. Now let the ship dive out and then bring the nose up slowly. Either the loop is finished or you are.

There is great value in knowing how to loop. In connection with this, we have heard of a lucrative new aviation problem about to arise in Holland. It is feared that Holland's windmills are becoming so numerous there will not be enough wind to supply them all. Graduates of the Gabriel Correspondence School can then hitch on and keep Holland's wheels of industry turning.—*Pacific Aeronautics.*

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JUN 7 1920

AERIAL AGE
WEEKLY

. 11, No. 13 JUNE 7, 1920 10 CENTS A COPY

An Airscape of a Section of Coney Island

One Hundred Sixty-two Delegates Arrived at Aero Congress by Air

LISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
criptions: Domestic, $4; Foreign, $6. Entered as second-class matter March 25, 1915, at the Post Office at New York under the act of March 3rd, 1879

In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

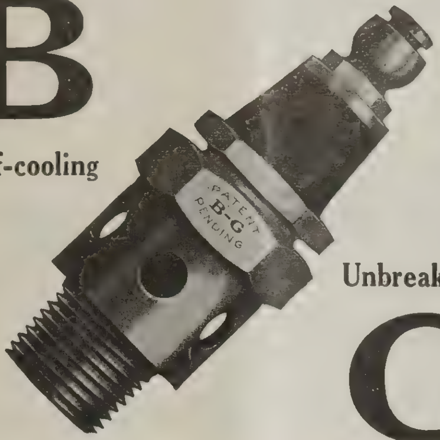
Aerial Transport Service

which, it is hoped, will eventually serve all of the important cities on the North American Continent.

The plans for this service have been developing for months and will vitally influence Civil, Commercial and Military Aviation throughout the world.

These plans are worthy of the confidence and support of all classes of Citizens, City, County, State and National Officials.

The quality of the personnel is a guarantee that the enterprise will be directed by men qualified by previous experience to manage successfully any undertaking they are identified with.



"The Plug that Cleans Itself"

Self-cleaning

B

Self-cooling

Unbreakable

G

Non-fusible

Cost Less In The Long Run

B-G Plugs not only increase the effectiveness of the motor, as has been conclusively proven in aeroplane contests for speed and endurance held in America last year, *but cost less in the long run.*

For example: Col. R. S. Hartz, in a Martin Bomber, completed the "Round-the-Rim" flight of 9,823 miles with the original set of 48 plugs, not one of which was removed during the entire trip from July 24 to November 13. These plugs had approximately 140 hours of warming up and flying at a cost of *only* $.0214 *per plug hour.*

Use B-G Plugs

to save your motor and your money

The BREWSTER-GOLDSMITH CORPORATION
33 Gold Street, New York City, U. S. A.

"The Plug with the Infinite Spark"

AERIAL AGE WEEKLY

VOL. XI JUNE 7, 1920 NO. 13

TABLE OF CONTENTS

PAGE
One Hundred and Sixty-two Delegates Arrived at Aero Congress by Air 429
Post Office Department to Award Aerial Mail Carrying Contracts. 430
The News of the Week.......... 431
The Aircraft Trade Review....... 433
The Loughead Sport Biplane...... 434
The Mounting of Anzani Radial Engines 435
Recent Aero Patents.......... 436
Aeronautic Instruments.......... 437
Naval and Military Aeronautics... 439
The Oertz Flying Boats.......... 440
Foreign News.......... 442
Elementary Aeronautics and Model Notes 443
Report of Latest Congressional Investigations of Billion Dollar Aircraft Expenditures.......... 448

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Fortieth Street, New York City.
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Entered as second-class matter March 25, 1915, at the Post Office at New York, under the act of March 3rd, 1879

Loading the two New York-Minneapolis planes at Roosevelt Field

-and the DAYTON COMPANY too

The Problem

To deliver from New York by air a consignment of merchandise to the Dayton Company of Minneapolis.

The Aeroplane

Curtiss-motored Standard J-1 aeroplanes were chosen to accomplish this *safely* and *surely*.

The Answer

2 NY R 10
Minneapolis Minn. 330 P May 10-11, 1920
Curtiss Aeroplane and Motor Corp.,
Garden City, Long Island, N. Y.
Miller landed Minneapolis nine,
Keyes eleven blinding rain.
Curtiss-Northwest Airplane Company

Curtiss

Member Manufacturer's Aircraft Association

Now the Dayton Company is using two Curtiss aeroplanes for express delivery in Minnesota.

Some day you will use an aeroplane in *your* business —why wait?

CURTISS AEROPLANE *and* MOTOR CORPORATION, *Sales Office:* GARDEN CITY, LONG ISLAND, N. Y.

Factories: Garden City, L. I., and Buffalo, N. Y. Flying Fields, Training Schools and Service Stations: Garden City, Atlantic City, N. J., Newport News, Va., Miami, Fla., and Buffalo. Dealers and distributors in all parts of the United States. Special Representatives in Latin America, Australia and the Philippines

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VOL. XI NEW YORK, JUNE 7, 1920 No. 13

ONE HUNDRED SIXTY-TWO DELEGATES ARRIVED AT AERO CONGRESS BY AIR

THE Third Pan-American Aeronautic Congress closed on May 30th with a Memorial Service to the fallen aviators and heroes who gave their lives to the Cause of Humanity and Civilization and for the advancement of aeronautics, at which U. S. Army, Navy and Marine Corps seaplanes and aeroplanes participated by dropping wreaths of flowers on the Steel Pier and in the ocean. The Memorial Service was held on the Steel Pier and was attended by the delegates of thirty-two countries and aeronautic organizations representing every part of the United States. The seaplanes started from the Inlet and the aeroplanes started from the Airport and flew over the Steel Pier dropping wreaths of flowers on the Pier and in the ocean while the Memorial Service was being held, under the auspices of the Aero Club of America, the Aerial League of America, the Pan-American Aeronautic Federation and other co-operating organizations.

Lieutenant Colonel Horace M. Hickam, assigned to the Congress by Secretary of War Baker and Major General Charles T. Menoher, the Director of the Air Service, was first, dropping a wreath of roses from the fast S. E. 5. He was followed by naval and Marine Corps aviators and then came Bert Acosta in the J. L. monoplane, who also dropped a large wreath of flowers while thousands of people stood bareheaded in honor of the dead heroes and pioneers of the air.

The Third Pan-American Aeronautic Congress has been pronounced, by representatives of the different countries and by delegates from six United States Government departments, the best and greatest aeronautic event ever held in this country.

Following are a few of the important demonstrations and achievements of the Congress:

From May 20th to May 30th, one hundred and sixty-two delegates arrived at the Congress by aeroplane from different parts of the country, and as many as thirty-five aeroplanes and seaplanes were at the Airport and at the Seaplane Station and moored at the Inlet and on the beach-front at one time. Nineteen delegates arrived by air on May 29th and twelve flew home on the morning of May 30th, including the "Honeymoon Express," with Mr. and Mrs. E. A. Terhune, Jr., who started back to New York on their way to Boston.

Six United States Government departments participated in the Congress, the U. S. Navy exhibiting a large seaplane fully equipped for war action and a number of the latest aeronautic motors and complete radio apparatus, which were demonstrated daily to the visitors under the direction of Commander J. D. Robnett and Lieut. Commander H. K. McCay, who were assisted by Lieutenants Winthrop E. Blackwell. Paul W. Carter, J. H. Tilton, D. A. Musk, F. Lamb, W. H. Cushing, G. H. Himes and Ensign H. F. Meecham, who flew daily in large twin motored seaplanes from Rockaway and other naval air stations, to Atlantic City.

Secretary of War Newton D. Baker and Major General Charles T. Menoher sent ranking executive officers to represent the Air Service at the Third Pan-American Aeronautic Congress, among those representatives of the Air Service being Lieut. Colonel Horace M. Hickam, especially appointed to read messages from Secretary Baker and General Menoher to the Congress, and who flew from Atlantic City to Washington in a British type S. E. 5 combat plane. Other officers who represented the Air Service at the Congress were Colonel John D. Carmody, Colonel G. C. Brant, Lieut. Colonel Hartney, Capt. Harry Drayton, Capt. Cleary, Lieut. Norris and Lieut. Roullot. All these officers flew to Atlantic city from New York and Washington in DeHavilands and other military aeroplanes.

The Marine Corps was represented by Major Evans and Lieutenants H. M. Collins and T. W. Young, who flew to Atlantic City from the Marine Corps Air Station at Quantico, Virginia. The U. S. Coast Guard Service, which is under the Treasury Department, was represented by Captain S. V. Parker. The Bureau of Standards and Department of Commerce was represented by Dr. S. W. Stratton, Director of the Bureau of Standards. Second Assistant Postmaster General Otto Praeger represented the U. S. Post Office Department, while the Department of Labor was represented by Commissioner John B. Lennon.

Delegates of thirty-two countries attended the Congress, among whom were Brig. Gen. L. E. O. Charlton, British Air Attache; Captain deLavergne, French Air Attache; Colonel A. Guidoni, Italian Air Attache; Senor I. Calderon, the Ambassador from Bolivia; Senor J. Lopez y Guitterrez, Minister from Honduras; Senor C. de Quesada, Vice Consul of Cuba; Senor Guillermo Hoppin, Vice Consul of Chile; Senor A. Ulloa, Consul General of Panama, and official delegates from twenty-four other countries.

Sixty-eight aircraft manufacturers and dealers and aerial transportation and aerial exhibition companies participated in the Congress, and there was organized the Association of Aeronautic Industries, which will include all firms interested in commercial aeronautics, whose membership includes manufacturers, dealers, distributers, aerial transportation, aerial exhibition and aerial insurance companies, and all other concerns interested in the development of commercial aeronautics.

Among the important events held were: the discussions of all the important aspects of the art and science of aeronautics and the testing and demonstrating of the latest types of aeroplanes, including the J. L. all-metal type aerial limousine and latest Curtiss touring type, Avro type, S. E. 5 type, the Norman Thompson seaplane, Sopwith Snipe, Martinsyde and DeHaviland number nine types, as well as six types of motors never before exhibited. The exhibitors at the Congress received orders for over two hundred aeroplanes, and there was announced at the Congress the organization of three gigantic aerial transportation corporations and other aerial companies which are to give employment to two thousand American aviators and mechanics.

The first demonstration of safety in the construction of aircraft and of devices which increase safety in flying and aircraft fireproofing and the latest type aerial life preservers were held for the Aerial League of America's Aerial Safety Trophy, and discussions were held and plans considered for twenty important aerial contests. These are only the most important features which made the Third Pan-American Aeronuatic Congress the most important aeronautic event ever held.

POSTOFFICE DEPARTMENT TO AWARD AERIAL MAIL CARRYING CONTRACTS

REFERRING to the policy which the Postmaster General will inaugurate this year, with reference to letting contracts for carrying mail for aeroplanes, Mr. Praeger said at the Third Pan-American Aeronautic Congress:

"Gratifying as has been the development of the aero mail under direct Government operation, the Post Office Department has always felt that additional incentive could be given for the development of commercial aviation through the letting of contracts for carrying mail by aeroplane in addition to the aerial operation by the Post Office Department itself. Accordingly, the Postmaster General asked Congress for authority to make such contracts and this authority was granted, with the limitation that the cost of carrying the mails by contract shall not exceed the cost of their transportation over the railroads.

"I hear it has been represented that the Post Office Department has already let, or promised contracts under this authority. No contracts have been let or promised but, judging from the number of prospective companies from the Atlantic to the Pacific, I feel hopeful that several good aero mail contracting routes will be put in operation during the coming fiscal year."

"Under the Postal Laws and Regulations governing contract mail service the procedure will be as follows:

"After the Department has selected routes on which the saving and cost of rail transportation will equal, say 50 per cent or more of the probable cost of operating an aeroplane route, with the utilization of a part of the cargo space of the planes, advertisements setting forth full details, will be made, and sealed competitive bids invited. Thus equal opportunity will be afforded to all and no one company, or group of men will have the edge on its competitor.

"The contract requirements will be reasonable but businesslike. Bond will be required for the fulfillment of the contract and ample equipment must be provided, so that dependable service may be maintained and failure, with consequent setback to aviation, be avoided.

"Within these limitations, all persons who may bid, will get a fair, square, and equal opportunity and everything that the Post Office Department can do to encourage and put commercial aviation on a contract business basis will be done with that same aggressive spirit that has characterized the development of the aero mails under Postmaster General Burleson's initiative and guidance.

$15,000,000 for Aerial Express

(Baltimore *Sun* Editorial)

THOUGH Congress has failed to take thought of the aeroplane tomorrow and make such provision of funds as would enable our Government to keep pace with other governments in developments of aerial traffic, private interests are making a start toward commercializing the air routes. Announcement was made Sunday at the third Pan-American Aeronautical convention by officials of the Aero Transport company that they had arranged to put immediately 500 aeroplanes in express and mail service and that their programme called for the operation of 2,000 planes within three years.

The A. T. corporation has laid out the country in ten zones. The first air route to be developed will be from New York to Chicago by way of Cleveland. The corporation has $15,000,000 capital and its officials say they have orders for commercial transportation sufficient to keep their planes busy for six months.

Speed is not the only recommendation for air traffic. It will cost less, according to A. T. corporation officials, to establish an air transport system round the world than to build a single track railroad from New York to Chicago.

It is worth while to note here that a campaign is being started in Chicago to make that city the center of aeroplane manufacturing in the United States. Is there a suggestion here for the Chamber of Commerce?

Air Trunk Lines

(Philadelphia *Ledger* Editorial)

THE first attempt to transport freight in large quantities by means of aeroplanes, which took place in Atlantic City, is a commercial event of the first importance. If it proves to be successful, it will solve more than one problem which has long been awaiting solution.

Probably at the beginning the cost of air transportation will militate against its general use. This has been the case with every new mode of travel in any form that has yet been devised, but if it shall prove to be a success, competition and inventive genius will soon bring down the cost to a point where the new service can be profitably used. For shippers to feel independent of the railroads will be a new sensation, and if the air lines can really compete in cost with the railroads many of our transportation troubles will disappear.

There was one unfortunate feature in connection with the experiment. That is that the projectors were unable to secure American-built planes and had to go abroad for their airships. America is lamentably far behind in aviation, but the best way to catch up is for these experiments to show that the transportation of freight by air is practicable both from the standpoint of safety and of cost. Once this is demonstrated the inventors and the business interests of the United States will do the rest. Like the automobile, the aeroplane, devised for pleasure originally, may develop into a tremendous commercial agency.

Message of Congressman Clarence F. Lea

"NO one would attempt to define the exact part that aeronautics is to play in the military and economic affairs of the future. Every thoughtful person will concede that aeronautics is to take an important and fascinating part in our military and transportation functions. The organizations participating in your Congress and Exposition, in conceiving the potential possibilities of aeronautics and in seeking by constructive devotion and effort to hasten development and greater usefulness of aeronautics, is performing a most commendable service to the progress of our time.

"The question of aircraft development includes a consideration of the part to be taken by the government in that work. The government is directly interested in aircraft development both from a military and commercial standpoint. Controversy over the form of the organization that shall represent the government in its aircraft activities has been more destructive than constructive, and not unmixed with personal ambitions. The particular form of organization is not the essential thing in aircraft development.

"However, I do not concur with the enthusiasts who have urged that a separate aircraft department is necessary and advisable for this purpose. The participation of the government in aircraft development is primarily essential on account of its military need of aeroplanes, and secondarily, for the encouragement of the commercial use of the aeroplanes, both for commercial purposes and for the incidental advantage that the government would receive from the increased efficiency of the aeroplane that its wide commercial use would tend to create.

"Efficiency and economy in experimentation and production require the co-ordination of the government's aeroplane activities. This is essential to avoid duplication and financial waste. No plan of co-ordination, however, should be permitted to stifle the efforts of any one department in advancing types of machines and equipment.

"A separate Air Service, with authority to co-ordinate experimentation, purchase, and production, to chart out air routes, encourage the selection of air fields and stations thereat, and to make and enforce rules and regulations for aerial traffic, could perform a very essential function in the development of aircraft. In my judgment, such a separate service should be a civilian organization co-operating with the Army and Navy, but free from military domination.

"A separate air department, having control of the training of air forces, the assignment of the same, and operations thereof, is impractical and would lead to extravagance and an unnecessary duplication of the present functions of branches of the War and Navy Departments. Training should take place with the forces with which the aviators would co-operate in case of war. Military aviation never can be anything other than simply an arm of the military organization and should not be a separate department any more than any other important section of the military organization. Effective military operations depend upon co-operative training and unified control over planning and execution. Such a separate air department would jeopardize the first element and probably destroy the latter two."

THE NEWS OF THE WEEK

New Six-Passenger Record

Atlantic City.—What is said to be the American record for a six-passenger aeroplane was made May 31 by the Larsen all-metal monoplane flying against time to Philadelphia and return without stop, as the final outdoor event in the third Pan-American Aeronautic Congress. The machine was piloted by Leo Mons, with A. R. Hawley, former President of the Aero Club; Lawrence Sperry, of New York; Henry W. Burton, of Cleveland; Joseph H. Shinn, of Atlantic City, and Miss Marion Wright, of Baltimore, as passengers. It left at 4:16 P. M. and rose to 10,000 feet. Above Philadelphia it dropped to 5,000 feet and headed back to this city. It crossed the finishing line at 5:22, having covered 120 miles in 59:34. The time was taken by officials of the club, headed by William H. Logue, Jr., of Baltimore.

Another machine of the same type, but equipped with a 160 horsepower engine and piloted by Bert Acosta and carrying William H. Poppin, of the Chilean Consulate; Lieutenant M. C. Hendricks, T. Ferre, Atlantic City; Miss Edith Larsen, New York; Lieutenant H. A. Fryckberg, Philadelphia; Miss Elizabeth Correy, Uniontown, Pa., and Augustus Post, secretary of the Aero Club, in an efficiency test, covered the same route in 1:28:44, flying time.

$33,000,000 for Air Service

Washington.—House and Senate conferees on the Army appropriation bill, tentatively agreed May 31 to fix the appropriation for the Army air service at $33,000,000.

Fireproof Dope Test

Atlantic City.—Turning themselves into a flaming comet, Aviators Kerwood and Campbell gave delegates attending the third Pan-American Aeronautic Congress a thrill when they tested a new preparation for making aeroplanes fireproof. A committee representing the Aero Club of America witnessed the daring stunt.

The two fliers donned special suits painted with the preparation and then permitted mechanicians to spray them with gasoline. The aeroplane was similarly "dressed." The men climbed aboard and flame was applied to both the plane and the aviators.

The plane then ascended and for five minutes anxious spectators watched the blazing ship shooting through the air like a star until the flames had burned themselves out. When the descent was made, neither the aviators nor the machine had suffered damage.

The Aero Club committee witnessing the test included Major A. W. Harris, Major Thomas Baldwin, Henry Woodhouse, Allan R. Hawley, John M. Larson, Augustus Post and R. M. Ammell.

For Air Traffic Control

Washington.—An Administration measure proposing regulation of aerial navigation within the United States and its possessions was introduced May 29 by Chairman Wadsworth of the Senate Military Committee. In transmitting the bill Secretary Baker asked for its prompt enactment. It was referred to the Commerce Committee.

The bill would create an Air Navigation Commission of eight members, which would draft rules and regulations affecting air navigation. It also would require that all aircraft, operators and airdromes be licensed and placed under the commission's jurisdiction. Licenses would be granted only to American citizens, but provision would be made for foreigners flying under certain regulations.

Aerial Customs in Force

The Ohio Flying School & Transport Company's first plane in a flight from Toronto to Akron, piloted by M. A. C. Johnson and John F. Aston, has the distinction of being the first to pass through the recently inaugurated U. S. Aerial customs.

Schroeder Official Altitude 33,000 Feet

The Bureau of Standards calibration of the two barographs used by Major R. W. Schroeder in his altitude flight on Feb. 27, 1920, has just been completed and report made to the Air Service.

Two Henry J. Green barographs were used in this flight. As the clockwork on one of the barographs stopped during the flight before the highest point was reached it became advisable to discard the record of this instrument in attempting to correct the records. The ground pressure existing at the time of the flight, according to the McCook Field mercurial barometer, differed considerably from the result obtained by correcting the pressure given by the Weather Bureau barometer at Dayton for the proper difference in elevation.

Consequently, the former figure was discarded on account of the probability of its being erroneous. Comment was made in the bureau's report on the extremely large instrumental errors found in each of the barographs, thus introducing some uncertainty into the calculations. The report gives the following determination of altitude:

Pressure difference from flight-history test	21.67 in.
Correction due to error of Boyce motometer	0.34 in.
True pressure difference	22.01 in.
Ground pressure, McCook Field, at start of flight (by Weather Bureau barometer corrected for difference in altitude of 150 ft.)	29.49 in.
True pressure at highest point	7.48 in.
Isothermal Altitude 37,850 *Feet*	
Isothermal altitude corresponding to 7.48 in. (A.I. Cir. No. 3)	37,850 ft.
Isothermal altitude corresponding to 29.44 in. (ground pressure at time highest point was reached by Weather Bureau barometer corrected for difference in altitude of 150 ft.)	420 ft.
Isothermal difference in altitude	37,430 ft.
Temperature correction for height of air column (mean temperature—29.2°C)	5,180 ft.
True difference in elevation	32,250 ft.
McCook Field above sea level	750 ft.
Probable altitude above sea level	33,000 ft.

Calculation of Schroeder's altitude in accordance with the rule of the Federation Aeronautique Internationale gives a considerably higher figure than the figure obtained by the Bureau of Standards method of calculation, the latter figure, of course, being the nearest approximation to the true altitude. Applying the F. A. I. rules for 1919, as interpreted by the Aero Club of America, the following altitude is obtained (in this case the temperature correction to the air column is not applied):

Isothermal difference in altitude as already computed	37,430 ft.
McCook Field above sea level	750 ft.
Apparent altitude reached	38,180 ft.

The Bureau of Standards' calibration was undertaken on the request of Lieut. Col. Hickam in order that all doubt as to the true altitude attained might be removed.

The Curtiss Wasp Seaplane which established a new Navy speed record recently of 138 miles per hour. It was piloted by Roland Rohlfs

Curtiss Wasp Breaks Navy Hydro Record

The Curtiss Wasp, designed and built by the Curtiss Aeroplane and Motor Corporation for the United States Navy, recently added another triumph to its already long list of achievements by establishing a new speed record for water machines.

Over the measured course of the naval air station at Rockaway, L. I., the Wasp triplane, equipped with a pontoon and piloted by Roland Rohlfs, Curtiss' test pilot, flew at the speed of 138 miles per hour, breaking the former world's record by twelve miles per hour.

The flight was made under official observation by the navy and, in four attempts over the course, an average of 138 miles per hour was maintained. The trials were made with a cross wind which, it is estimated, cut at least two miles an hour off the speed.

The former record was held by the Curtiss HA-Hydro which, equipped with a 400-horsepower Liberty motor, made a mark of 126 miles per hour last year. Following its final test, the Wasp was turned over to the United States Navy and will be flown soon to Hampton Roads, Va., and used in training work.

Three world's records are now held by the Wasp and another was only recently wrested from it by a scant margin.

The Wasp sprung into prominence as a remarkable performer when, with full military load, it attained a speed of 162 miles per hour in observed Navy trials. It had been designed and built by the Curtiss Company as a two-place fighter during the war, but the ending of hostilities left it without an opportunity to demonstrate its ability at the fighting front. Its trial performances, however, stamped it as one of the most notable additions to the aeronautical world. Its stream-lined body, reducing to the lowest possible minimum the wind resistance, together with the remarkable performance of its motor —a Curtiss Twelve, 400 horsepower— made possible its tremendous speed.

New Three Passenger Height Record

Dayton, Ohio, May 22.—Pilot B. L. Whelan set to-day a new pilot and three-passenger unofficial height record of 18,200 feet. The old record was held by C. B. Coombs of Mineola.

K. M. Turner, the pioneer aeronautic enthusiast, who has been elected President of the Aero Club of Southern California

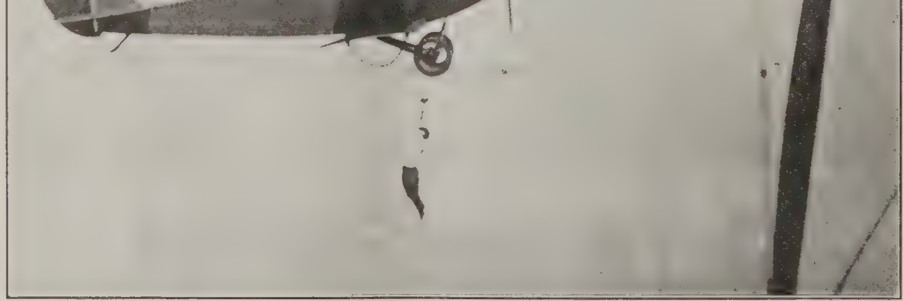
Air Trip to Alaska in Ten Hours Planned

The work of mapping aerial routes between the United States and Alaska will be begun immediately with the view of instituting commercial lines to the territory from Seattle as soon as possible, according to E. N. Gott, Vice-president and General Manager of the Boeing Airplane Company of Seattle. The initial flight will be made with flying boats over a thousand miles of impassable territory between Seattle and Skagway.

"There are no railroads between the Northwest and Alaska, and the only means of communication thus far has been the steamer," Mr. Gott said yesterday. "It requires from four to five days to make the trip over a course which practically is the same that we will use. This course leads out of Puget Sound and inside the coast line the entire distance. We expect to fly the distance in ten hours' flying time, as compared with 120 hours it takes to make the trip by boat.

"Our project has the indorsement of business men and Chambers of Commerce in the Northwest, who are anxious to bring Alaska nearer the United States. We will inaugurate an express and passenger aerial service, carrying the mail as well. It is not the purpose of our company to remain in permanent charge of this venture, as we are manufacturers of aircraft, but some one had to take the initial step and it was up to us."

Mr. Gott said that beginning July 1 his company would start an aerial mail service between Seattle and Victoria, B. C., carrying United States mail intended for the Orient. Outgoing ships stopping at Victoria would be able to pick up the American mail twenty-four hours earlier than at present, when it is necessary to carry it across Puget Sound by boat, he said.



Daredevil McLaughlin performing one of his latest stunts—hanging by the teeth from a machine in transit

Airport for Springfield, Mass.

The Eastern Aircraft Corporation of South Boston, Mass., announces the informal opening of the Springfield Airport. The company is already operating several two and three-seater planes for passenger carrying, advertising, exhibitions, photographic surveys, etc., and acts as distributors in New England.

The Springfield Flying Club, composed mostly of enthusiastic business men of the city who are awake to the opportunities of aviation, co-operates with the company and the Airport is their authorized aerodrome where all flying activities are carried on. The officers of the club are: President, J. S. Harrington; vice-president, L. J. H. Harley, Jr.; secretary, C. F. Spellman; treasurer, O. H. McIntyre; flying manager, Wesley L. Keough. Active participation in flying is now going on and the club has plans for a gala day on the formal opening of the Airport in June and eventually a clubhouse to be erected at the field.

The field is located at the S. E. corner of the city, at the junction of Sumner Ave. and Allen St., only about two miles from the heart of the city and approachable by two car lines. It is marked with a white S and a T is used for visiting planes, which will find aerial garage facilities complete. The Springfield Aviation School is also centered at the Airport and many new aviators will be added to the list of 100 qualified pilots now located in Springfleld. Because of its central location, this aerodrome is ideal as a stopping place for planes making the Boston-New York run, or from points in Southern N. E. to Vermont and the upper Connecticut Valley.

The Eastern Aircraft Corporation has its offices, factory and assembly plant at 340 First St., So. Boston, and has put out their own machines as well as distributed a number of JN4s, which have been equipped with OX5 and Hispano 150 H.P. motors. The officers of the corporation are: President, John R. Honors; vice-president, Walter N. Stiles; secretary, Edward N. Carpenter; treasurer and general manager, Edward A. Terhune, Jr.; operations manager, Wesley L. Keough.

Campbell to Give Exhibitions Again

Mark M. Campbell, aerial acrobat, is soon to start on another exhibition tour with Lieut. Goldsworthy, pilot, their first stop being at Portland, Oregon, on June 6.

Mr. Campbell does all the stunts possible on an aeroplane and also changes from one aeroplane to another in the air without the aid of a ladder. He successfully jumped from a train to an aeroplane and back to the train again last February in California. He was the first to accomplish this feat, thus having that honor instead of Mr. Oakley, as previously announced in AERIAL AGE.

The AIRCRAFT TRADE REVIEW
N. E. J.

Commercial Airship Has Test Flight

Hundreds of persons witnessed the christening and first flight of the 92-foot dirigible of the Commercial Airship Syndicate at Kansas City, Mo., on May 15.

Beginning May 25 the ship will start on its regular route, stopping at Joplin, Bartlesville, Tulsa, Oklahoma City, Ardmore, Ft. Worth, Dallas, Dennison, McAllaster, Muskogee, Coffeyville, Iola, and Kansas City.

This ship will be followed over the route by a ship with a gas capacity of 8,400 ft. and being 201 ft. long and 42 ft. in diameter. The total weight of the entire ship over all is 7,200 lbs., while the useful load is about 3 tons. Equipped with two motors it is capable of making a speed of 64 miles or more per hour.

Bombing Plane Christened

The United States Army L. W. F. bombing plane has had its trial flight at Mitchel Field, Long Island. Miss Henrietta Hall, daughter of Colonel C. J. Hall, of the Army Air Service, broke a bottle of champagne over the machine.

The craft, which was piloted by Lieutenant E. E. Harmon and had as passenger John Miller, of the L. W. F. Engineering Corporation, stayed up only ten minutes. Another test trip will be made shortly.

Supervise Cotton Growing From Air

For the first time in history, cotton growing will be supervised from the air, when within the next four months a small dirigible will be used for this purpose on the 28,000 acre plantation of The Goodyear Tire and Rubber Company at Goodyear and Litchfield, Arizona, near Phœnix.

At present mounted overseers are employed, but the company has been obliged to use more modern means by the acquisition of many thousand more acres of desert which will be irrigated to grow long staple cotton used in fabric for the manufacture of automobile tires.

Besides its use for purposes of supervision, the dirigible will probably be used to transport Goodyear officials to Phoenix and even as far as the California factory at Los Angeles, a trip of about 400 miles.

For these purposes the "pony blimp" type of airship will be used because of its ease in handling and small crew requirements. Built as the first dirigible used in this country for commercial purposes, the little airship, probably the smallest practicable dirigible ever constructed, is now being manufactured at the company's shops in Akron, Ohio. Completion is expected within four months, after which the ship will be sent to Arizona and used for inspection and supervision of the immense cotton plantation of the company in the midst of the desert.

But 95 feet long, 28 feet high and 40 feet in diameter, this 35,000 cubic foot capacity dirigible will be able to make a speed of 40 miles an hour over the plantation and will have a range of 400 miles at cruising speed. The pilot and overseer will be able to cover the plantation easily in a short time and can make landings at any point where attention is required.

Company officials believe that the use of an airship for purposes of supervision on the cotton plantation will show that this commercial use of dirigibles can be extended to wheat field survey and similar purposes.

Aeroplane Delivers Motion Picture Film

The latest use of the aeroplane for transportation purposes was demonstrated between Denver, Colo., and Casper, Wyo., during a spring blizzard that tied up the railroads. The commandeering of the aeroplane to take the place of the railroad was the idea of Mr. W. R. Sample, owner of the Iris Theatre in Casper, Wyo., who did not desire to disappoint his patrons.

He had advertised extensively that he would show a feature picture, and the photoplay could not be delivered because of the railroad tie-up. Consequently, he chartered a flyer who made the 300-mile journey successfully, and while the aeroplane was in transit, Mr. Sample passed word to the local newspaper that the show would be held as usual because the films were being delivered by aeroplane.

The town turned out to welcome the aeroplane with its precious cargo of film. And as a result of Mr. Sample's emergency idea, the crowds that came to the theatre paid for the extra expense of transporting the photoplay in this unusual way.

Personal Par

Walter C. Robbins has resigned as chief engineer of the Curtiss Aeroplane & Motor Corporation, Buffalo, N. Y., and is now practicing consulting engineering in that city. He is specializing in internal-combustion engines, manufacturing, aeronautics and automobiles.

Aeroplane Saves Grain Firm

Grand Island, Neb.—Unable to arrange for the routing of several hundred carloads of grain as a result of the destruction of telegraph and telephone lines by the recent storm which swept the Middle West, a Grand Island firm of grain merchants saved several thousands of dollars as a result of the efficiency of the aeroplane.

The Highland Grain Company, of Grand Island, Neb., whose operations extend into Wyoming, Montana and Idaho, had many contracts to fill before the emergency freight rate, made on account of conditions brought on by the severe draught last season, was discontinued by the railroads on April 1.

On March 29 a severe wind and sleet storm completely cut off all telegraph and telephone communication in Nebraska, leaving the company without means of notifying its trade as to billing.

J. H. Highland, manager and owner of the Highland Grain Company, unable to use the mails because of the necessity of prompt action, chartered a Curtiss Oriole plane from the Grand Island Aero Company, distributors of Curtiss aeroplanes in Nebraska, and Pilot Earle Barnes, accompanied by W. M. Woodhead, one of the officials of the grain company, started out on a 500-mile trip. They visited all points in Nebraska from which they had grain to be moved, gave instructions as to shipping and as a result were able to fulfill every contract prior to the expiration of the drought rate.

This is the first time that the aeroplane has been used by grain merchants, but the company was so enthusiastic over the trial that it is planning to purchase an aeroplane for every-day use.

The Farmers' Grain and Coal Company of Palmer, Neb., is undoubtedly the first company in the world to sell a car of grain to a representative of a wholesale firm, using an aeroplane as a conveyance.

Inspection lineup at the Philadelphia Aero Service Flying Field, a weekly Sunday morning event. Left to right, Instructors McClellan, Robb, Allison and Davis

THE LOUGHEAD SPORT BIPLANE

General Description

THE Loughead Sport Biplane is a single-place aeroplane designed and built to give maximum results at a minimum of expense. It embodies no radical departures from standard aircraft design, and its performance is due to the scientific reduction of weight and resistance obtained by patented methods of construction.

Every thought has been taken to make the plane a "one-man job," and the result is that practically any small field or country road becomes an aerodrome to the owner of a Loughead Sport Biplane. The patented wing-folding feature reduces the housing space required to such an extent that any good garage is a suitable hangar.

The speed range is such that when in flight the plane is at all times equal to any emergency and responsive to the controls; yet the low landing speed makes it a safe plane for the novice to fly.

In addition to the conventional controls a lever is placed at the side of the seat which throws the lower wings into a vertical position through an arc of 90 degrees, thus placing them in a convenient position for folding alongside the body, and also providing an extremely effective air-brake which makes it possible to stop the plane within from 50 to 75 feet of the point where the wheels first touch the ground. At the same time the lift of the wings is reduced nearly 50 per cent., so that the plane has no tendency, even in a strong wind, to leave the ground after landing.

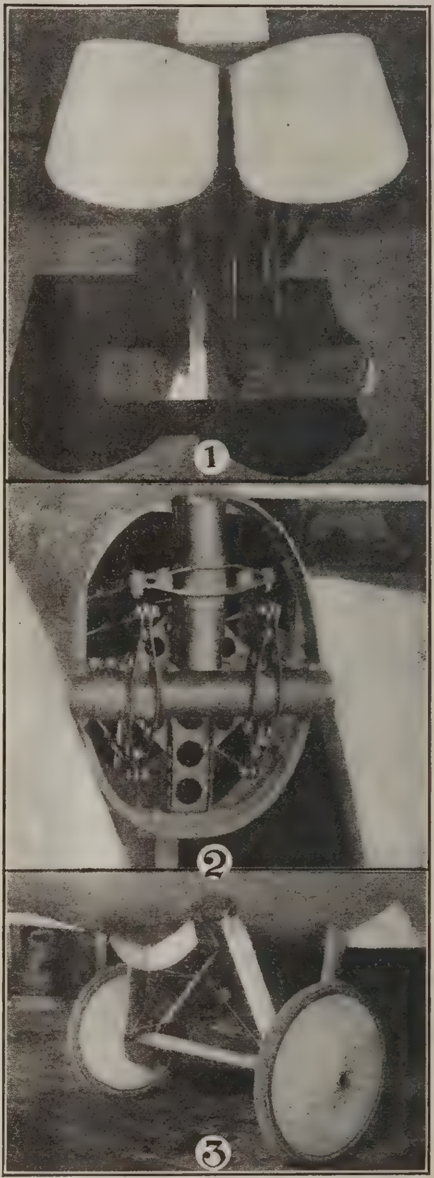
Fuselage Construction

The fuselage of the Sport Biplane is of the well-known "monocoque" type, consisting of a thin shell of plywood reinforced by transverse bulkheads. It is much stronger than the box-girder, or longeron type, and adapts itself perfectly to streamline form.

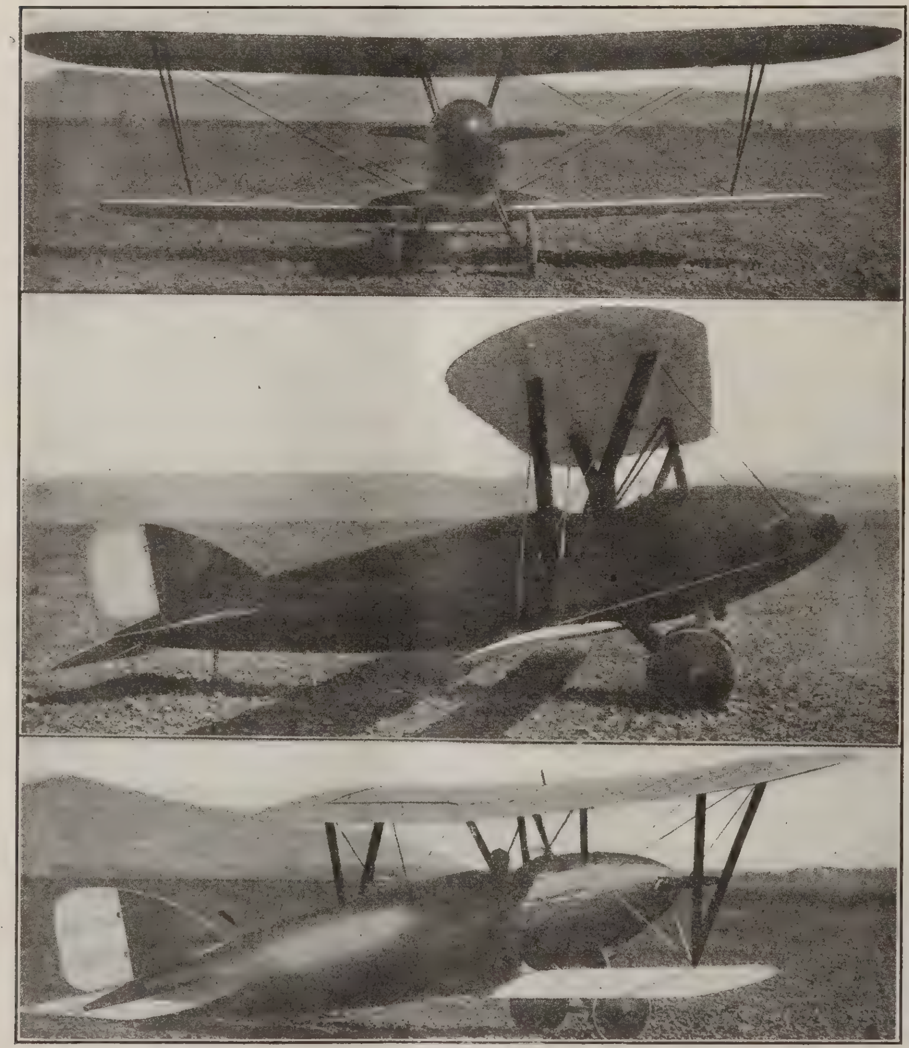
When the designers decided that a "monocoque" body was to be used in the Loughead Sport Biplane, it was necessary to develop new methods of manufacture before the aeroplane could be offered to the public at a reasonable price.

So successful were the experiments which followed, that it has been proven that the "monocoque" body could be built stronger, lighter, and at less expense than any other type.

In the new process evolved by the Loughead Aircraft Company, arrangements have been made to handle the many strips composing one complete layer of plywood as a unit. The three complete layers of plywood are successively applied to a mould which determines the shape of the body; binding cloth and water-proof Casien glue being applied between the layers. The three layers are then subjected to a uniform air pressure of twenty pounds to the square inch, which is maintained over the entire surface until the glue has set.



1. Tail view with wings folded. 2. Rudder and elevator control terminals, with the aluminum tail piece removed. 3. Landing gear showing radiator mounting



Front, side and the three-quarter rear view of the Loughead Sport Biplane

This process produces a plywood shell of a uniform thickness of one-eighth of an inch, which is stronger for a given weight than any other fuselage yet developed.

At all points of attachment of the landing gear, wings, struts, etc., the weight is evenly distributed over large areas through reinforcing blocks and plates.

To its light weight, secured through this method of construction, may be accredited to a great extent the performance of the Sport Biplane.

Upper Wing

The upper wing is built in three sections. The fuel tank is located in the forward part of the center section, and the trailing edge is hinged at the rear spar permitting it to be raised when pilot is getting in or out of cockpit. Simple, but very rigid latches hold it in place during flight.

The fact that no ailerons are employed makes it possible to use the most efficient semi-eliptical form for the wing tips on both the upper and lower planes. The entering edge is spruce plywood, routed out except at points of attachment, and the trailing edge is of steel wire.

Strut Arrangement

The upper and lower wings are supported by a "V" strut near the wing tips which is solidly bolted to the upper wing spars, and fastened to the spar of the lower wing by a simple but rigid pin connection.

Lower Wing

The lower wing is similar in form to the upper, except that one deep spar serves to brace the wing in all directions. This spare is pivoted at the body and at the lower end of the "V" strut, allowing the whole wing to rotate, and it is this action which affords a very simple, efficient, lateral control. The pivoted point is just forward of the center of pressure of the wing, so that there is very little strain on the lever mechanism which transfers the motion of the control stick to the wing.

Tail Surfaces

The horizontal and vertical stabilizers are rigidly braced internally, eliminating all external bracing rods. The main bar of the elevators is a large diameter steel tube to which the control levers and wires are fastened inside the fuselage. The rudder is constructed in the same manner, and all control surfaces are made amply strong, so that no external masts and braces are needed.

By removing the quick-detachable aluminum tailpiece all turnbuckles are readily accessible for inspection and adjustments.

Tail Skid

The tail skid is mounted in such a manner that there is no connection between the fuselage and the skid itself except through its rubber mounting. This minimizes all shocks and makes a mounting that is absolutely dependable.

Landing Gear

The landing gear is of conventional type, but has been simplified and lightened to limits consistent with safety. Rubber shock absorbers are employed, and this unit has a factor of safety of over 10 to 1.

Factory of Safety

A factor of safety of over 6 to 1 by actual sand load test has been maintained throughout the machine. This, coupled with the extremely light loading of only three pounds to the square foot, insures sufficient structural strength to withstand the strains of any performance to which it can be subjected.

Specifications

Maximum Speed (full load—
horizontal flight) ....70 miles per hour
Minimum Speed (full load—
horizontal flight) ....25 miles per hour
Landing Speed ....25 miles per hour
Rate of climb.......700 feet—first minute
Service ceiling................12,000 feet
Gliding angle....................10 to 1
Weight:
  Empty (with gas, oil, and
  water for 450 miles)..........375 lbs.
  Loaded ....600 lbs.
  Useful load ....225 lbs.
Fuel consumption.....50 miles per gallon
Range of flight (without
replenishing fuel)............450 miles
Wing Span (upper)..............28 feet
Wing Span (lower)..............24 feet
Over-all width (wings folded—
patented) ....10 feet
Height ....7 feet, 3 inches
Length ....20 feet
Controls:—Stick—
  Original Patented Lateral Control.
  Two Elevators.
  Foot bar.
  One rudder.
Instruments: — Complete equipment including altimeter, motor thermometer, oil pressure gauge, gasoline gauge, etc.
Position of fuel tank:—In center section with sight gauge always in view.
Standard Finish:—Fuselage maroon,—wings cream color.
  Special finishing work done to order in our own factory.
All wires, cables, bolts and metal parts are thoroughly rust-proof by our own process which does not injure the materials and protects them indefinitely.

THE MOUNTING OF ANZANI RADIAL ENGINES

The Anzani is designed to be supported by long bolts passing through the crank case from front to back. This arrangement, which has proven entirely satisfactory in practice, has no doubt been responsible for the fact that one form of mounting has been almost universally adopted,—a capping plate of heavy gauge sheet steel, provided with flanges bolted to the rails of the body, has a circular opening in it to clear the magneto, oil pump, etc., and around this opening, (and uncomfortably close to it, by the way) are holes corresponding with the long bolts passing through the crank case.

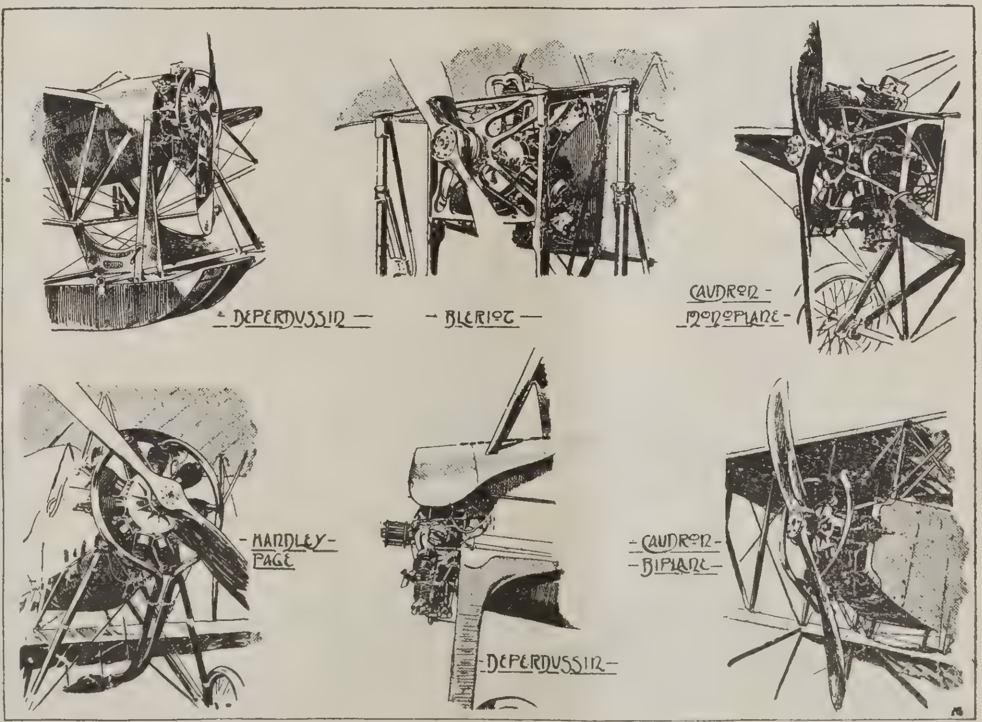
In some machines, where this mounting cantilever fashion has been thought insufficiently rigid, the front of the crankcase is supported by tubes running from the front end of the crankcase bolts to some suitable point on the machine, thus relieving the engine plate of some of the buckling strain to which the cantilever mounting subjects it.

A glance at the accompanying sketches, reproduced from *Flight,* will show that these are practically identical in all the examples shown, with the exception that in some instances an auxiliary support is provided in the form of tubes running back to the main framework of the body. This, it will be seen, is the case with both Caudron machines.

In the Handley Page, a single tube supports the front of the engine, passing through the cowl and up to the top of the cabane that carries the upper plane.

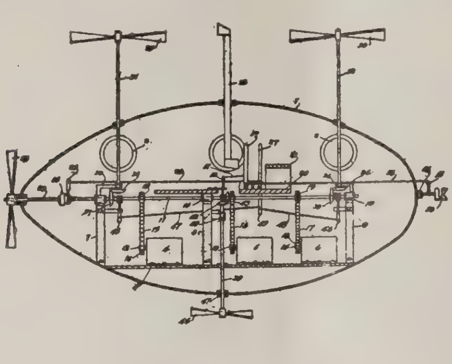
The Bleriot is provided with a pressed steel frame supporting the front end of this propeller shaft, which runs in a ball bearing set in the steel frame. From the point of view of rigidity of the mounting, this method is obviously a better engineering proposition than the usual cantilever mounting.

The mounting on the Deperdussin seaplane is such that the cylinders hardly project beyond the sides of the body, which appears to offer a good deal of resisance besides decreasing the cooling efficiency of the motor. In the British Dep monoplane, a small aluminum shield surrounds the upper part of the engine, protecting the pilot at least from the oil from the upper cylinders.



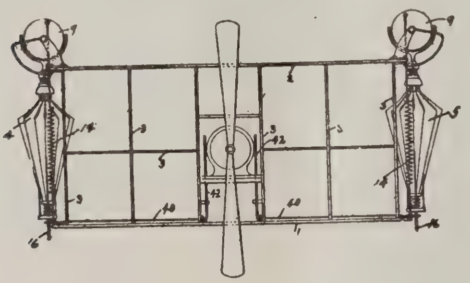
RECENT AERO PATENTS

1,175,[illegible]39. AIR-NAVIGATING MACHINE. David McIntyre, Brandon, Manitoba, Canada. Filed Oct. 18, 1915. Serial No. 56,587. (Cl. 244—19.)



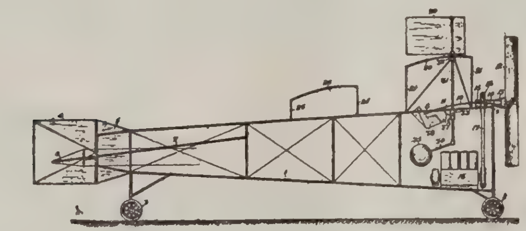
A combination air and water navigating machine comprising a water tight casing, a plurality of engines suitably mounted in the casing, a main driving shaft, drive connections between the engine shafts and the main shaft, a front propeller alined with the driving shaft, manually operated means for coupling the drive shaft to the propeller shaft, a plurality of vertically disposed propeller shafts passing upwardly through the casing, horizontally disposed propellers mounted on the latter shafts, a disengageable driving connection between the latter shafts and the main drive shaft, a vertically disposed propeller shaft passing downwardly through the casing, a propeller located on the lower end of the latter shaft, a disengageable driving connection between the latter shaft and the main driving shaft, a rear rudder secured to the casing and means operated from the interior of the casing for manipulating the rudder.

1,175,363. SAFETY ATTACHMENT FOR AEROPLANES. Percy R. Lea, San Francisco, Cal. Filed Oct. 7, 1914. Serial No. 865,472. (Cl. 244—21.)



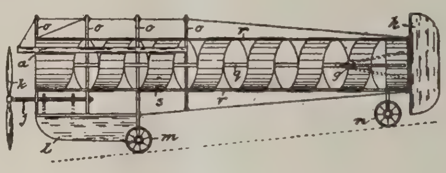
1. The combination with an aeroplane, of a parachute at each end of the aeroplane, means to carry said parachutes normally in a closed position with their tops downward, manual means for releasing the parachutes, means to rotate the parachute through a considerable angle when released, mechanical means for releasing the parachute ribs when being turned from the inoperative position to the operative position, and mechanical means for opening the parachutes when being so turned.

1,175,474. AIRSHIP. Harry L. Roderick and Harry D. Newhart, Oroville, Cal.; said Newhart assignor to said Roderick. Filed Mar. 20, 1911. Serial No. 615,488. (Cl. 244—29.)



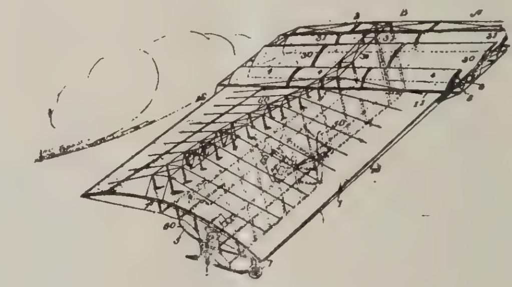
1. In an airship, a main transverse aeroplane comprising two aeroplane sections spaced apart centrally, their rear edges being lower than the front edges to increase the pressure of the air passing thereunder beneath said front edges, said sections being so inclined transversely that air having its pressure so increased escapes past their inner ends into said central space, and an auxiliary rectangular aeroplane having its front edge in the rear of the front edge of the main aeroplane, and its rear edge in the rear of the rear edge of the main aeroplane and at a distance therefrom less than the depth of the main aeroplane and at a higher level, extending over said central space and over the inner ends of the main aeroplane sections to receive the upward pressure from the air escaping into said central space from said main aeroplane, and likewise having its rear edge lower than the front edge.

1,165,805. AEROPLANE. Adolf Frederik Ringstrom, Jr., Siken, Norway. Filed Aug. 9, 1915. Serial No. 44,628. (Cl. 244—30.)



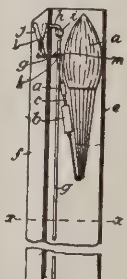
In aeroplanes the arrangement of a skeleton cylinder along the horizontal axis of the machine and a strip of cloth or the like wound around the said skeleton with comparatively wide openings between the turns for the purpose specified.

1,175,511. AEROPLANE AND THE LIKE. George H. Ellithorpe, Marbleheaed, Ohio. Filed Jan. 23, 1911. Serial No. 604,218. (Cl. 244—14.)



1. An aeroplane, comprising a main plane in longitudinal length at least equal to the transverse width thereof, said plane being arched upwardly from side edge to side edge at its front or advancing edge and being approximately flat at its transverse rear or following edge, the under surface of said plane being concaved longitudinally and laterally, and main lateral balancing devices arranged above and below said plane along the central longitudinal line thereof and provided with manually controlled actuating devices.

1,173,515. AERIAL ILLUMINATING DEVICE FOR USE IN CONNECTION WITH AIRCRAFT. Harold Edward Sherwin Holt, Farnborough, county of Hants, England. Filed Aug. 31, 1914. Serial No. 859,568. (Cl. 102—20.)



1. An aerial illuminating device having means for discharging the same from an air craft comprising a tube, an illuminating body provided with a time fuse, weight and flare and disposed in said tube, an igniter attached to the fuse and adapted to be operated by a direct pull thereon, and coöperating means connected with said tube and igniter for imparting a direct pull to the igniter when the weight and other parts are discharged from the tube.

AERONAUTIC INSTRUMENTS

General Principles of Construction, Testing and Use

By MAYO D. HERSEY

(*Continued from page* 405)

f The application of the moving picture camera, by means of an automatic timing mechanism, for the purpose of securing a record of instrument reading during the performance test of an aircraft in flight. The whole outfit, instruments, illumination, camera and timing-system, is self-contained and forms a unit which takes the place of the human observer in the aeroplane.

g A working model of a type of dynamical ground speed indicator which would become available if there existed a suitable gyro-stabilizer to hold it horizontal. This model consists of a large steel ball free to roll back and forth in a glass tube filled with a viscous liquid. It can be shown mathematically that if the fluid resistance is directly proportional to the speed of the ball through the tube, while the tube is held in a horizontal fore-and-aft position, then the displacement of the ball at any instant from its initial position in the tube is directly proportional to the absolute ground speed of the aircraft.

The development work on any given model of an instrument must be dropped and the design rigidly fixed before quantity production can be efficiently carried on. In this country the quality of products made in quantity has to be artificially held up to standard by means of specifications and inspection. This situation is not so commonly met with abroad, especially in France, where every individual involved, from the mechanic in the shop up to the head of the concern, takes a professional artistic pride in the quality of his output. This difference is not the fault of the American manufacturer, and there are some advantages in our system, yet the fact remains that in Europe, instrument production has been successfully carried on without specifications. This spectacle of successful instruments formed one of the most astonishing impressions which the writer gathered from his trip to Europe during the war.

Testing of Instruments

The testing of any aeronautic instrument consists in general of a direct comparison with some suitable standard, the instrument being operated from point to point over its full scale: the whole procedure should then be repeated under different temperatures or other important conditions varying in flight. The most important of these conditions are:

a Extreme low temperatures.
b Change in pressure or density of air.
c Acceleration and inclination.
d Vibration.
e Time elapsed during the flight.

A typical installation of testing apparatus, in this instance for the testing of tachometers, is shown in Fig. 4. The results of such a test are ordinarily given out in the form of tables or curves showing the correction of the instrument from point to point of its scale. By the correction is meant the amount that has to be added algebraically to the reading of the instrument in order to give the true value of the quantity measured. Typical correction plots or curves of this sort are seen in the first two charts shown on Fig. 5.

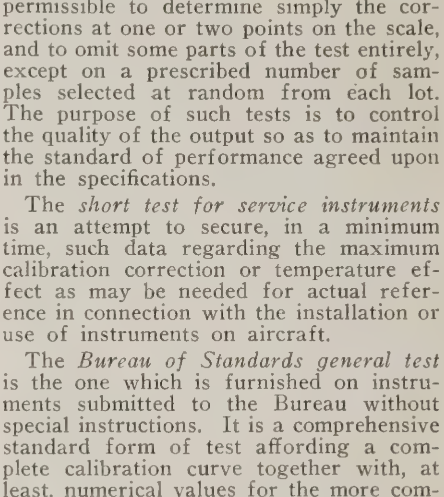
There are various degrees of refinement possible in the testing procedure, and instrument tests may be classified as follows:

a Factory inspection tests.
b Short test for service instruments.
c The Bureau of Standards general test.
d More thorough tests on sample instruments.
e Special tests on experimental instruments.
f Reproduction of the flight-history.

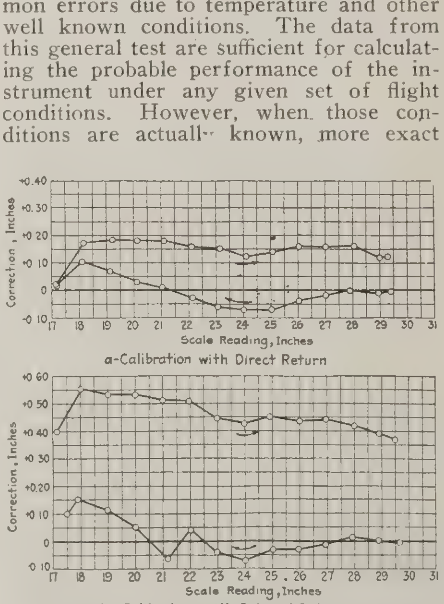
Factory inspection tests can be reduced to a comparatively simple routine after the first few instruments of each pattern have been inspected. In some cases it is permissible to determine simply the corrections at one or two points on the scale, and to omit some parts of the test entirely, except on a prescribed number of samples selected at random from each lot. The purpose of such tests is to control the quality of the output so as to maintain the standard of performance agreed upon in the specifications.

The *short test for service instruments* is an attempt to secure, in a minimum time, such data regarding the maximum calibration correction or temperature effect as may be needed for actual reference in connection with the installation or use of instruments on aircraft.

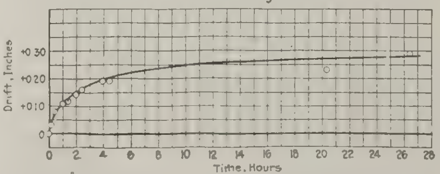
The *Bureau of Standards general test* is the one which is furnished on instruments submitted to the Bureau without special instructions. It is a comprehensive standard form of test affording a complete calibration curve together with, at least, numerical values for the more common errors due to temperature and other well known conditions. The data from this general test are sufficient for calculating the probable performance of the instrument under any given set of flight conditions. However, when those conditions are actually known, more exact results can be obtained by carrying out the flight-history tests described under (*f*) below.



a-Calibration with Direct Return



b- Calibration with Delayed Return



c-Change in Reading with Time, at Constant Pressure

Fig. 5 Charts Showing Effect of Elastic Lag on Altimeters

The Bureau makes *more thorough tests on sample instruments* of new type whose mechanism is not familiar. Such additional observations usually include some form of accelerated life-test, such as a five-day run to determine the endurance of the instrument under vibration. For this purpose adjustable vibrating stands have been made which reproduce the condition of vibration of an airplane instrument board. The steadiness of the pointer and the accuracy of the instrument with and without vibration are also observed in connection with such a test.

The *special tests on experimental instrument*, depend, of course, on the nature of the work for which the instrument is to be used, and on the flight conditions which will prevail. The readings in such a test may have to be taken to a higher degree of precision than usual, and may require specially refined standards.

For instruments such as aneroid barometers, which involve serious errors due to elastic lag or temperature lag, there can be no more reliable method of determining the corrections necessary for the interpretation of the readings than to make a *flight-history test* by actually reproducing in the laboratory the identical variation of pressure, temperature, etc., which was experienced from time to time during the flight. This is particularly important in connection with the use of barographs for competitive altitude flights. It is now well known that barographs subject to any appreciable amount of elastic lag will read a higher altitude the greater the time elapsed during the flight.

It is a short step from some of these more complete testing methods to the general subject of the experimental investigation of sources of error in instruments. Such investigations have formed one of the most interesting features of the work of the Bureau of Standards and are illustrated by Figs. 5 and 6, which are based on experiments with high-grade aneroids.

In Fig. 5 the first chart (*a*) shows the ordinary calibration of an aneroid changing the pressure at the rate of an inch of mercury in five minutes. (At sea level one inch of mercury corresponds to about one thousand feet of altitude. At twenty thousand feet one inch corresponds to about two thousand feet of altitude). The calibration curve would be distinctly different at some different speed, due to elastic lag in the corrugated metal vacuum boxes. For the same reason, as shown in the second chart (*b*), the discrepancy between the readings going up and coming down is much greater when the aneroid is held at the maximum altitude for a considerable time interval. This drift, or change of reading at constant pressure, is shown in the third chart (*c*) as a function of the time elapsed. Such curves may be taken as a criterion of the elastic quality of the material in the instrument; and several hundred such have been determined in the course of the Bureau's investigations. The curves in Fig. 6-A show the increase in the width of the hysteresis loops with rise of temperature, and it also shows the decrease in the sensitivity of the movement when an instrument is chilled. This last effect is largely due to the change of elasticity with temperature, and cannot be fully compensated for by means of the ordinary bimetallic lever. The remaining curves, Fig. 6-B, show, on the other hand, what can be done in the way of temperature compensation. One represents a typical uncompensated aneroid. The graph shows the change of reading with temperature at a constant pressure corresponding to sea-level conditions. Another shows a partial degree of compensation obtained by admitting air to the vacuum box. The third shows satisfactory compensation by means of a bimetallic bar so far as sea-level observations are concerned; but this same aneroid may have a serious temperature error when the movement has shifted into the new position which it will occupy at twenty thousand feet.

Still further characteristics of aneroid barometers have been studied at the Bureau in addition to those shown in Figs. 5 and 6 and similar investigations have been extended to all of the other aeronautic instruments.

Use of Instruments

Many practical airplane pilots disclaim the use of instruments, and certainly it is desirable that the aviator should be trained to become just as independent of any mechanical aid as possible. Yet it would hardly do to equip planes without all of the usual service instruments, for those instruments which one pilot thinks he can dispense with are precisely the ones the next pilot would insist upon having. And if the instruments are to be installed at all, even though they may not be read frequently, it is necessary for them to be reliable, and so the whole subject has to be studied and put on a solid scientific foundation.

Some of the times when airplane instruments are really of the most importance are the following:

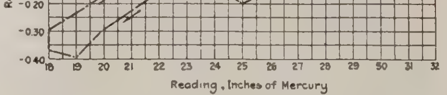
- *a* For various military and naval operations such as bomb dropping
- *b* Long distance navigation
- *c* Flying at night and in clouds
- *d* Preparing to land on a perfectly smooth body of water where the height is deceptive
- *e* Flying in formation with instructions to hold to a prescribed air speed and altitude
- *f* Photographic and survey work.

The need for instruments is still more evident in airship work. Here it is necessary to control the position of the ship, especially near the ground, with comparatively greater precision; nor is it possible for the pilot to act so quickly in response to his unaided senses as it might be in an aeroplane.

The following precautions may be suggested for getting the best results in the practical use of service instruments:

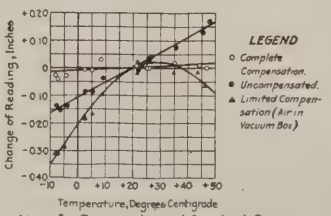
- *a* Select for installation in the first place only those instruments which can be certified by the Bureau of Standards as suitable for the intended use. Such approval will ordinarily depend more on the performance of each individual instrument as evidenced by tests, than it will upon the make or design.
- *b* In any event, see that the instrument is tested immediately prior to installation to avoid the occurrence of large errors due to secular changes or to mechanical injury. If the errors thus found are not considered negligible, a small correction card can be furnished with each instrument.
- *c* Where accuracy is required in flight observations the aviator must refer to these corrections. He also must remember where appreciable lag errors are stated to exist, whether due to elastic lag or temperature lag or other causes, that some time will be required for the instrument to completely respond to any given change, and that the results will be different with increasing and decreasing scale readings. Instruments are usually adjusted to be correct for increasing readings. If such instruments show an appreciable lag during the test, then in service they will tend to read too high when the pointer is falling.
- *d* At least once in six months it is desirable that instruments should be overhauled, during which time they may perhaps be replaced by a reserve supply of fresh instruments properly tested and adjusted. Instruments which are visibly damaged or out of adjustment may be sent to some central station such as the Bureau of Standards for salvaging. Even if they are not visibly out of adjustment near the zero point of the scale, they may reveal surprising errors further up on the scale if properly tested, and this should be done periodically.

The problem of salvaging has been studied by the Bureau of Standards both in connection with the writer's official visit to the various aerodromes and salvage stations abroad during the war and more recently in connection with the salvaging of instruments for the Air Mail Service. The statistical results of such work are of the greatest value as a basis for future improvements in instrument construction, and should provide the raw material for important scientific study. The actual salvage proposition consists of dismantling a certain number of damaged instruments and putting them together again so as to form a smaller number of good instruments. The study of expedients for readjusting the mechanism forms an integral part of such work. This can only be done in the testing laboratory. Now unless it is early discarded in favor of some new type, it will be the destiny of every instrument that is manufactured to come back for salvage or readjustment eventually. Hence the facility with which such readjustment can be made, is a criterion not to be overlooked in connection with the purchasing of instruments. Such readjustments have to be made with due regard to securing a uniform scale and a satisfactory degree of temperature compensation. In some cases it is simpler to prepare new dials graduated empirically to fit the altered performance of the movement.



Calibration of Same Aneroid at Three Temperatures

A



Calibration for Temperature at Constant Pressure.

B

Fig. 6. Charts showing Effect of Temperature on Altimeters

So much for service instruments. The use of experimental instruments, on the other hand, is more obvious, since they do not form a part of the permanent equipment and are called for only when actually needed for special observations. The procedure for such observations is too elaborate to go into here except by way of illustration. Consider, for example, the use of the barograph for high-altitude determinations. The following is an outline of the procedure for determining

- *a* The most probable altitude
- *b* The official altitude for competitive purposes in accordance with the rules of the International Aeronautic Federation.

Whichever method of computation is to be used, only such barographs should be selected for the flight as have passed, or could pass, the performance requirements for a Bureau of Standards certificate. Particular attention should be given to the reliability of the clockwork, which is preferably such as to give a rapid movement to the drum: for example, one revolution per hour. The pressure scale should also be as open as possible, which means an extra tall drum. The whole movement must be rigid and strong. The pen must be adjusted without undue friction, but so that the ink will flow freely and trace a delicate but definite line. Charts graduated in pressure units are convenient, and must be of good quality.

Unless the barograph is practically free from temperature errors, a standardized thermometer should be attached to the barograph case and several readings taken during the ascent. And unless the barograph is also free from temperature lag, such a thermometer should be placed inside the case, with its bulb close to the vacuum boxes.

For the *most probable altitude* determination, two barographs may be taken, and the results averaged after all corrections have been applied. In this method, the pen may be adjusted before leaving the ground to read the true pressure as determined by a standardized mercurial barometer at the field. Readings of a good strut thermometer or thermograph should be obtained at least every 2,000 feet for the determination of atmospheric temperature distribution.

To determine the instrument correction at the starting point and at the ceiling by laboratory test after the flight, the flight-history method of testing should be used; that is the barographs should be put in a receptacle within which both temperature and pressure can be made to follow sensibly the same curves with regard to time that were experienced during the flight. By comparison with a standardized and fully corrected mercurial barometer, the true pressures corresponding to the base and ceiling readings can thus be found.

The altitudes corresponding to these two pressures are next to be found on the 50 deg. Fahr. altitude-pressure table issued by the Bureau of Standards. By subtracting the base altitude from the

(*Continued on page* 450)

NAVAL and MILITARY AERONAUTICS

First Annual Air Tournament at Bolling Field

The week of May 15 was one of extreme historical interest at Bolling Field. The First Annual Army Air Tournament was held under the auspices of the field, and marks the turning point in the Air Service from the post-war indefiniteness to the peace time reorganized regime.

The tournament was conceived and organized in a very short time and yet was a complete success in every sense. Its purpose was to acquaint the public with the progress, extent, and limitations of aeronautics together with an insight into what the future has in store in this line. Everyone who attended was thoroughly and rightfully amazed at the achievements and it is felt that they also conceived to a better degree how their own faith and convictions when constructively bent toward aeronautics would hasten the unquestionable benefits to be derived from the daily use of aircraft both from a military as well as a civil point of view.

The first day of the tournament, Friday, May 14, dawned with lowering skies and threatening rain. To many still skeptical, the thought came that the tournament would have to be postponed but aeronautics have outgrown the days when weather conditions were an absolutely controlling factor and today only the more violent of meteorological conditions can prevent or endanger the operation of aircraft. Punctually at ten in the morning the first event scheduled which was a formation flight directed by wireless telephone from the air was carried out perfectly. From this time on during the rest of the day all the events were carried out as planned and noticeably each event scheduled was on time. The punctuality of such a program as was presented is considered remarkable for even in ground meets of a similar competitive nature it is doubted if the adherence to schedule as was the case in this instance has ever been bettered.

The ground exhibit was complete to the last detail. Within the hangars were to be found on all three days of the show many exhibits of extreme interest. In Hangar 8 at the south end of the field was an exhibit of air bombs. These bombs were for every conceivable purpose and were of French, English, American, and German design and construction. There were also bomb sights, anti-aircraft guns, and ammunition. Of the bombs the most impressive was the 1100 pound Mark I American Demolition Bomb. This bomb was designed for destroying factories, warehouses, power plants, large railroad terminals, public buildings, big gun emplacements, fortifications, docks, canal terminals, and so forth. The other bombs were of varied size and shape exhibiting many unique details in their handling and operation, and also showing in some cases how certain difficulties in the early part of the war were overcome by ingenious adaptations as for instance turning obsolete artillery material into up to date and extremely effective air weapons.

In Hangar 7 was the exhibit of the Engineering Department. This consisted of fuselage and wing repair, construction, and covering, showing to good advantage the intricate nature of the present day aeroplane. Propeller repair and construction was also seen in this same exhibit. At the other end of the hangar one was able to view the Hispano-Suiza Motor complete and in various stages of assembly, together with the Liberty Engine and rotary engine.

Hangar 3 displayed a small model of the regulation army observation balloon constructed by the men in the vocational school at Lee Hall, Va. This model was one-fifth actual size and was complete in every detail.

The radio hut was open for inspection and proved to be a very popular exhibit. Here all phases of wireless communication and directional work were demonstrated together with the military and tactical employment of radio apparatus.

Aerial operations were displayed in the operations office where aerial maps, observation and weather reports were on display.

In the enlisted men's recreation room was a small exhibit of aerial photography composed chiefly of the photographs brought back from England by the Assistant Secretary of War Benedict Crowell.

On all three days of the tournament there were a series of extremely interesting competitive events. First on the program daily was a unique closed course air race. The entrants in this event were lined up on the field and made a common take off after which they negotiated twice a course around the Washington Navy Yard Chimneys, the Dome of the Capitol, the Washington Monument, and the Steel Mill Chimneys. This formed a somewhat traingular course of about twenty-five miles. The fastest time for this course was eight minutes and forty-seven seconds. The contestants were at all times in full view of the spectators at the field and there was keen rivalry and interest in these races which included also an enlisted men's race. The planes entered were SE-5's, DH's, Sopwith Snipe, Nieuport, Spad, and Fokker.

Shortly after the race, an acrobatic contest took place. In this event the contestants had to perform two reverse turns, five loops, two barrel rolls, a tailspin with six turns, and a falling leaf within five minutes after reaching the prescribed altitude in order to be rated.

Variations of aerial combat formed an added attraction daily, and then an attack on the observation balloon being demonstrated during the tournament was staged whereupon the observers jumped in their parachutes as the closing event of each days tourney.

On the line were to be found the Martin Bomber that went around the rim of the United States, a D7 German Fokker that came in from Middletown Depot, 133 miles in 58 minutes, a Martin Torpedo Plane, with a regulation Naval Whitehead Torpedo suspended beneath, a giant Handley Page, a diminutive SE 5, a Martin Bomber with a Baldwin Automatic Cannon mounted on it capable of firing 120 one pound shells per minute, a DH 4 equipped with German bomb releases and carrying German 100 kilogram bombs, a DH 4 with eight machine guns and practically no blindspots, a Breuget Bomber with Liberty Motor, a DH 4 and DH 4-B, a Vought, an Ordnance Scout, a Spad, a Bristol Fighter, a Curtiss JN with wireless equipment, an Avro, and a Loening Monoplane.

On the three days of the tournament it is conservatively estimated that the events were viewed from some vantage point or other by at least eighty thousand people. All the events were run off without a single mishap of any sort or kind and this even in the face of some of the most incessant difficult flying exhibited in this country since the close of the war program. The First Annual Army Air Tournament closed a tremendous success and everyone voted it an extremely commendable and magnificently conducted affair.

A New Photographic Section

The Fourth Aerial Photographic Section was recently organized and sent from duty at Langley Field, Hampton, Virginia. 2nd Lieut. G. E. Wood was made commanding officer of this unit. The Section has been sent to Fort Leavenworth, Kansas, on temporary duty and will proceed later to Post Field, Fort Sill, Oklahoma, for permanent station.

The Dornier metal seaplane, equipped with two 260 H.P. Mayback engines, and with cabin capacity for eight passengers

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THE OERTZ FLYING BOATS

THE following notes, translated from *Flugsport*, dealing with an interesting series of flying boats, designed and built by the Oertz Works at Hamburg, Germany, may be of interest. This factory was, before the war, chiefly concerned with the building of yachts and motor boats.

The fight for existence between the flying boat and the float seaplane commenced in the very earliest days of seaplanes. Even now the final decision as to whether the flying boat or the float seaplane offers the best solution for aerial transport over the sea has not been made. The experience gained during the war cannot straightaway be applied to peace conditions. At the moment the flying boat people naturally have the last word, since a flying boat was the first to cross the Atlantic safely. After the questions of weight and air resistance, the most important point in the evaluation of the advantages and disadvantages of the two types is that of seaworthiness. By this is meant the possibility of getting off and alighting with a certain amount of sea running, and also to be able to "live" when on the surface in rough weather. The performance required is in direct opposition to the qualities of seaworthiness, since a seaplane, to be seaworthy, must necessarily be of very substantial construction, which can only be provided at the cost of a fairly heavy weight of the hull and machine.

Next it would appear that the float seaplane would be superior to the boat seaplane in the matter of seaworthiness, since the boat has a very low freeboard and therefore will be more likely to be swamped while taxying than will the float seaplane. Moreover, the lower plane of a boat seaplane is much nearer to the water than is that of a float seaplane, so that there is more likelihood of it coming in contact with the sea. It will, therefore, be seen that the difficulties that beset flying boat constructors are by no means small.

With regard to the questions of weight and air resistance, it must be said that the flying boat is more favorably placed in both respects. Although for powers of 150 to 240 h.p. the weight of the two types does not differ greatly, the advantages of the boat seaplane increase with size. Thus a float seaplane of 1,000 h.p. will be about 4,400 pounds heavier than a boat seaplane of the same power.

From the point of view of air resistance, the fact that a float seaplane has a fairly extensive strutting arrangement for the floats, while the boat seaplane can be made of fairly good stream-line shape, gives the boat type a smaller resistance than that of the float type, even when, as is sometimes the case, the engine of the boat seaplane is placed on a structure above the boat proper.

After balancing up the pros and cons of the case, taking into consideration the practical experience of the Navy, one arrives at the conclusion that the flying boat type, as regards medium and large size machines, is superior, also as regards seaworthiness. For types of up to about 300 h.p., possibly the float seaplane will be found the most suitable, while for types of from 300 h.p. to 700 h.p. there would seem to be little to choose. For larger types, however, the flying boat type appears to be the most promising.

Among the most successful and therefore most noteworthy flying boats are those designed by D. Ing. Max Oertz, which were built at the Oertz Works at Hamburg. Dr. Oertz, the famous yacht and motorboat builder, was one of the first in Germany to realize the possibilities of flying and the suitability of his works, with their special facilities and trained workmen specalists, for the requirements of aircraft construction. Above all, the Oertz Works were not laid out as quantity production works, but were used to meet the special requirements of yacht construction by scientific investigation into the smallest mechanical details, and to devote an absolutely loving care to workmanship and finish.

These fundamental facts, which were reflected in all new productions of this scientifically working factory, whether boats or flying machines, could already be noticed in the very first machine built in 1910. This was a land machine, a monoplane with monocoque body, which weighed only 770 pounds, and fitted with a 70 h.p. Gnome engine reached a speed of 80 m.p.h. This first success encouraged Oertz to return to his proper element, the sea, and to apply the same principles to the construction of a flying boat; this was ordered by the Navy in the spring of 1913. Already in the autumn of the same year this flying boat could show its usefulness by successful test flights at Breitling, near Warnemünde. This machine, which is shown in Fig. 5, was fitted with a 100 h.p. Argus engine placed down in the boat, and driving the airscrew through shafts and bevel gearing. This arrangement, the constructional details of which had been worked out by Dr. Oertz himself, was something quite new for those times, and this first boat already showed the characteristics of all later Oertz flying boats. Among these is chiefly the devision of the planes into two halves and the slanting struts, with means for quickly dismantling the complete plane *cellule*. In looking at this flying boat, the thing which at once attracts notice is the very large chord of the lower plane, compared with that of the top wing. The object of this arrangement was to raise the center of pressure of the biplane, and thus reduce the undesirable pendulum effect caused by having the engine in the hull. The objections to this effect have, however, later proved to be of small importance.

One of the greatest difficulties of that time was to design a boat hull which should have the greatest possible amount of lateral stability when on the sea. The French flying boats of that date had very narrow hulls, which necessitated fitting auxiliary floats to the lower wings. In anything of a sea, these wing floats were a constant danger to the plane, owing to the shocks and stresses set up. It was in this respect that the art of the experienced yacht builder came to the rescue. Oertz provided a boat hull, which not only had a very good streamline form, but which also possessed a very great amount of lateral stability on the sea; so much so that it was possible for a man to walk half-

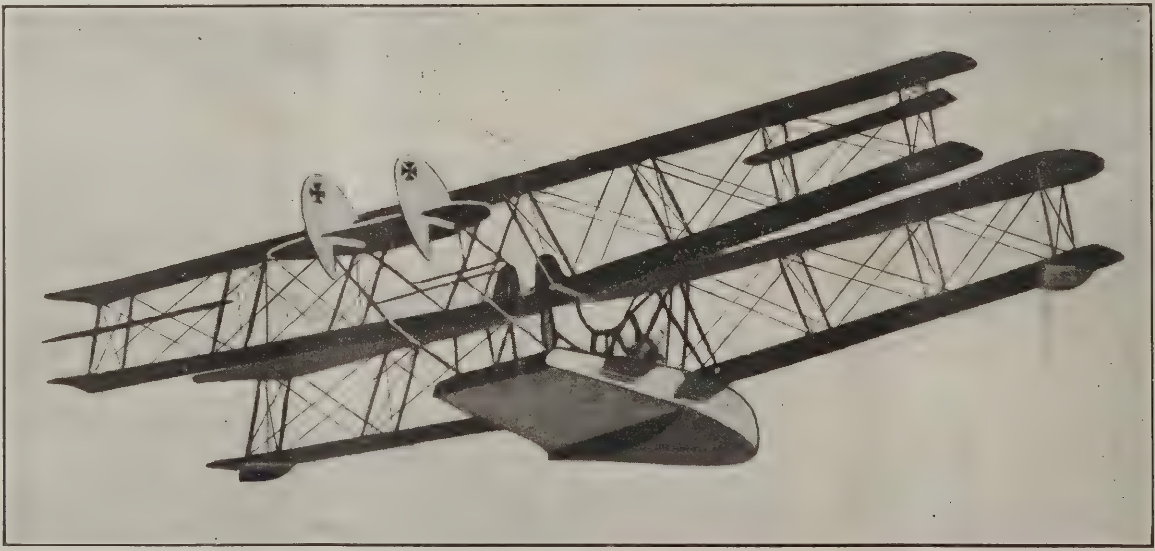


Fig. 1—The German Oertz tandem biplane boat, equipped with Maybach motor

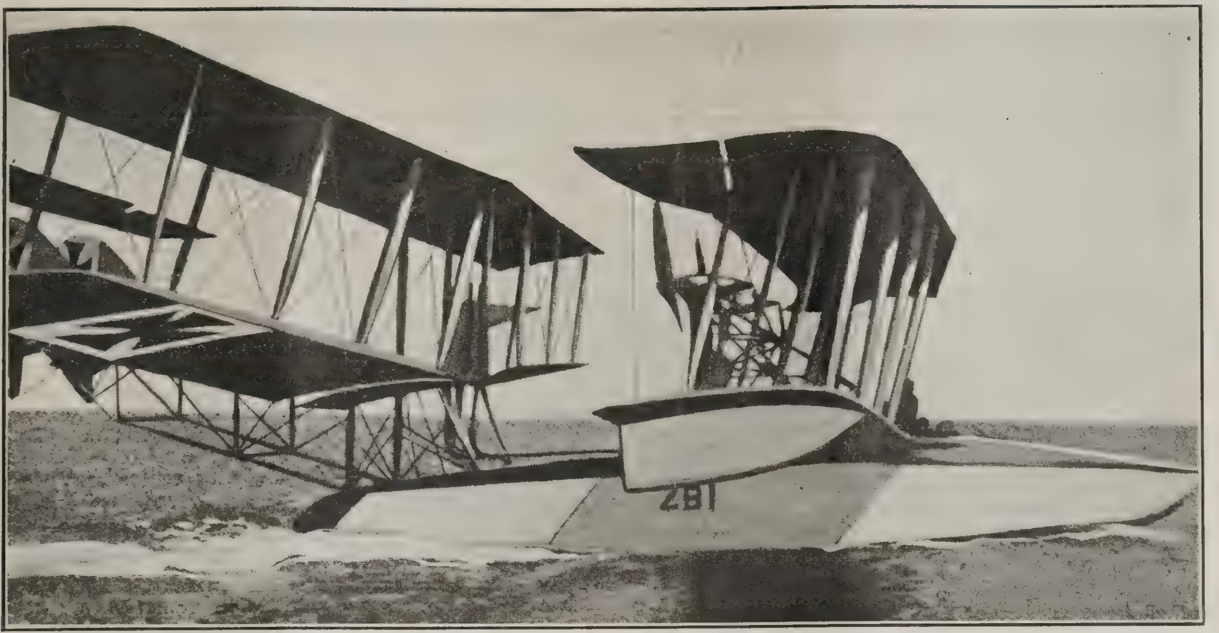


Fig. 2—The Oertz "Flying Schooner" taxying

way out on the lower plane without the machine heeling over enuogh for the plane to touch the sea. This great lateral stability on the sea has remained one of the features of all Oertz flying boats to this day. In order to reduce the danger of the lower wing tips cutting under when the machine is rolling in a sea or taking off, the lower wing tips were provided with flat spring boards which prevented, by their dynamic action, the tips from cutting under. These spring boards are shown in illustrations 3 and 4.

At the first attempt the boat flew well, and proved the soundness of its design. Especially was the transmission found to work well, although on account of trouble with the engine itself no flights of very long duration were attempted. The first boat was perfectly smooth, that is to say, it had no step. In order to improve the getting off, experiments were then commenced on hulls provided with a step. The first boat of the stepped type appeared in the spring of 1914, and is shown in Fig. 5. The machine was fitted with the first 160 h.p. Daimler engine. The photograph shows the general graceful lines of the hull and the large lower plane, which has upturned *ailerons,* after the manner of the old Taube. The illustration also gives a good idea of the slanting inter-plane struts which gives equal distances between supports in upper and lower planes. On account of the late arrival of the engine, the boat was not ready for its first

(*Continued on page* 454)

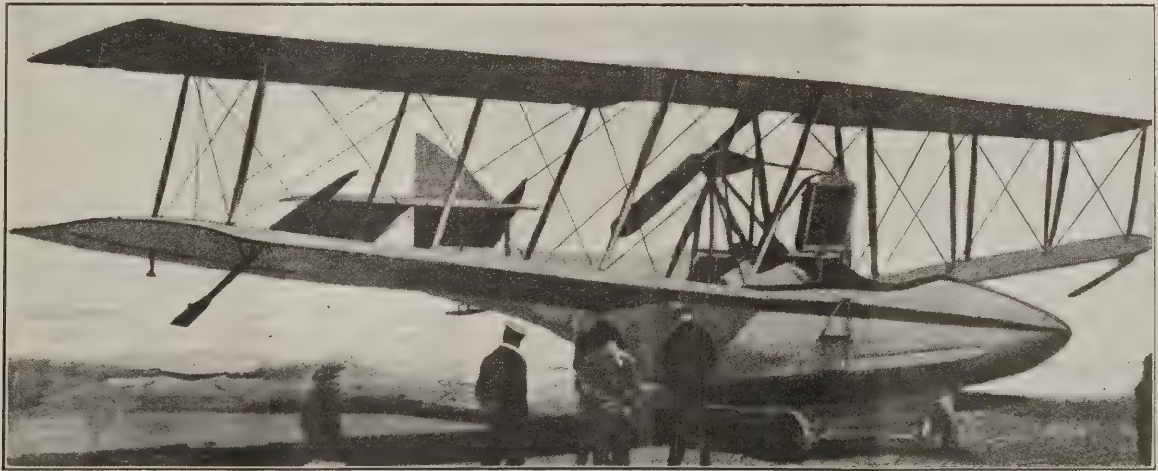


Fig. 3—Oertz flying-boat of 1915, fitted with 240 H.P. Maybach engine, although the machine was designed for a 260 H.P. Argus, which could not be obtained

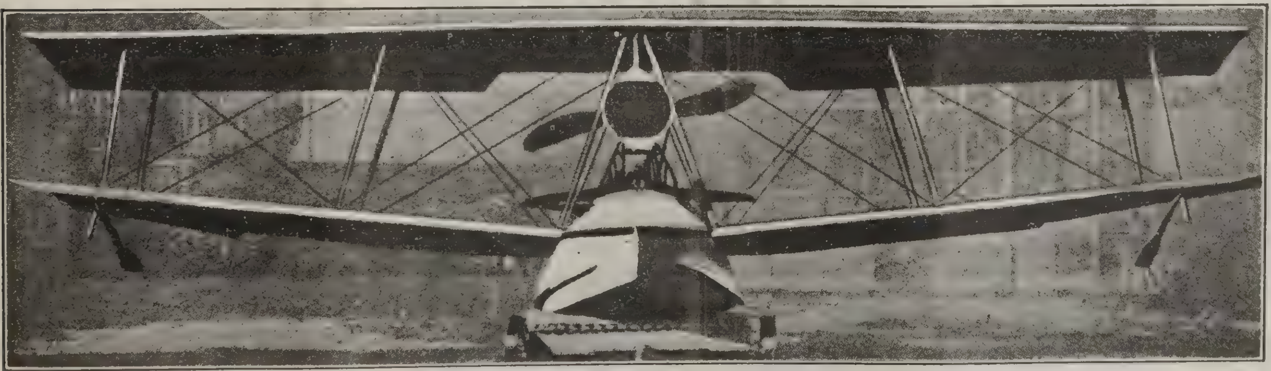


Fig. 4—Front view of Oertz flying-boat, 1917

FOREIGN NEWS

Aviation in Scandinavia

Representatives of the four Scandinavian countries have drafted laws to cover aviation in their respective countries, and they are to be submitted shortly to the four Parliaments.

Aerodromes and Landing-Grounds

The British Air Ministry has just issued a consolidated list (Notice to Airmen, No. 40) of the aerodromes and landing-grounds open to civil aviation. This contains all additions and amendments up to April 1, 1920. Copies can be obtained by those interested from the Air Ministry.

H.P. London, Paris and Brussels Air Services

On the Handley Page Continental Air Services run in conjunction with Cie, Messageries Aériennes, Paris, between September 2, 1919, and April 17, 1920, inclusive, 1,218 passengers and 66,318 lbs. of freight have been carried over a distance of 90,299 miles.

Zeppelins for France

Two Zeppelins which have been allocated to France under the Versailles Treaty are to be delivered shortly. One is the L 72 and the other is an LZ of recent construction. The first will be handed over to the navy and taken to Cuers-Pierrefeu, the naval air station in the Var. The other will be transferred to the Department of Aerial Transport and placed in the hangar at Maubeuge, which the Germans enlarged during the war. The airships will be taken to France by German crews under the control of a special mission, which will leave Paris when notice is received from the Inter-Allied Aeronautical Mission.

A Swiss-German Convention

It is reported from Berne that the Swiss Political Department is busily engaged in negotiations in connection with the drawing up of an aerial convention between Switzerland and Germany on similar lines to those recently concluded between Switzerland and France and Great Britain.

Commercial Aviation in Denmark

A company, under the style of Dankluftfartsselskab, has been formed in Denmark, and has demanded from the Government concessions to enable them to establish various aerial services. Their equipment includes 14 machines.

Turin Exhibition Postponed

The International Aviation Exhibition which was to have been held at Turin at the end of this month and the beginning of May has been postponed to October next.

Advisory Committee Reports

The following reports of the British Advisory Committee for Aeronautics were published by H. M. Stationery Office during the month of March, 1920:

241. Investigation of the Fracture of Exhaust Springs (Revised). (With diagrams.) March, 1916. Price 4*d*.

256. Wing Forces on Aeroplane Struts and Wires. (With diagrams.) June, 1916. Price 1*s*.

627. Design of a Recording Three-dimensional Accelerometer for use in Aeroplanes. Price 3*d*.

638. Longitudinal Stability of an Aeroplane. September 1919. Price 6*d*.

A National Airship Factory for Britain

In the Cardington airship constructional works near Bedford, which have now been taken over by the British Government from Messrs. Short Brothers, the Air Ministry has secured for the country what will become forthwith a national airship factory. It is understood that the Ministry has re-engaged practically the entire staff at the works, which are most up-to-date and conveniently situated.

The R-38, the rigid airship which is to be transferred to the Government of the United States, is at present being built at Cardington. The R-37 is also at Cardington receiving finishing touches, and there are also several small non-rigid airships being re-rigged.

Italian Flyers Reach Seoul

Seoul, Corea.—Lieutenant Masiers, one of the Italian aviators in the Rome to Tokio flight, reached Seoul from Wiju, on the northwest frontier of Corea, making the flight of about 285 miles in two hours.

Lieutenant Rorison, U. S. Pilot in Kosciusko Squadron, Safe

Warsaw.—Lieutenant Harmon C. Rorison, of Wilmington, N. C., the pilot in the Kosciusko aerial squadron who previously had been reported as missing, is safe, according to word from the front.

A bullet pierced Lieutenant Rorison's gasoline tank while he was flying over the Bolshevik lines, but he returned within the Polish lines and landed safely. Several days later he made his way to the headquarters of the Kosciusko squadron.

Speed Construction of Colossal Italian Dirigible

Rome.—Work is continuing at high speed to complete the colossal dirigible which soon is to attempt a flight from Rome to Buenos Aires. The craft will be capable of transporting 100 people. A trial flight was successful with Deputies Durati, Morgani and Trozzi aboard.

Announcement was made late last year that the Airdrome at Ciampino, near Rome, was busy building a new dirigible destined to cross the Atlantic Ocean. The airship, it was said at the time, would be capable of traveling 3,125 miles without refueling. The airship, reported as the British R-34, which had a trial flight over Rome recently, was the T-34, an Italian semi-rigid craft.

Paris-Prague Aerial Service Ready

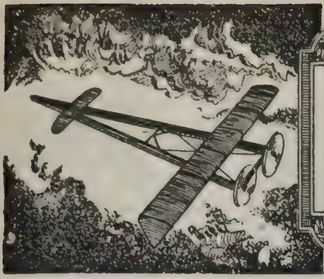
Paris.—Daily aeroplane service between Paris, Prague, Bucharest and Constantinople will be possible by next year, according to Captains Deuillin and Fleurieu, formerly of the French army, who have organized the new line which is to be in operation before July, 1921. The first section, Paris to Prague, is ready for trips. The Czechoslovaks have cooperated with the French in the construction of aerodromes.

British firms are already developing a line from Constantinople to Bombay. Before 1922 it should be possible to journey through the air from London to India, changing machines in Paris, Prague and Constantinople, in no more than fifty hours' flying time.

Berlin Aero Plant Now Movie Studio

Berlin.—The famous Albatross aeroplane works at Johannisthal, a suburb of Berlin, has been transformed into Germany's greatest moving picture studios on almost an American scale, according to the proud promoters. The former aviation field is adapted for the filming of open air mass productions and the railroad tracks on the grounds enable the filming of train scenes on the premises.

Captain Ranza and Lieut. Marzari being given a cordial "send off" on the Rome-Tokio race. A two-seater S. V. A. is shown in the background



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon

CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB
921 Ravenna Boulevard, Seattle, Wash.
BAY RIDGE MODEL CLUB
8730 Ridge Boulevard, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE CLUB
Bloomington, Indiana
BROADWAY MODEL AERO CLUB
931 North Broadway, Baltimore, Md.
TRIANGLE MODEL AERO CLUB
Baltimore, Md.
NEBRASKA MODEL AERO CLUB
Lincoln, Nebraska
BUFFALO AERO SCIENCE CLUB
c/o Christian Weyand, 48 Dodge St., Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicago, Ill.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bldg., Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB
455 Murray Ave., Milwaukee, Wis.
CONCORD MODEL AERO CLUB
c/o Edward P. Warner, Concord, Mass.
MODEL AERO CLUB OF OXFORD
Oxford, Pa.
CAPITOL MODEL AERO CLUB
1726 M Street, N. W.
Washington, D. C.
AERO SCIENCE CLUB OF AMERICA
Beach Bldg., E. 23rd St.,
N. Y. City
AERO CLUB OF LANE TECHNICAL HIGH SCHOOL
Sedgwick & Division Streets, Chicago, Ill.

New Model Club in Pittsburg

The following letter was sent to me by Mr. Karl S. Leach, of Pittsburgh, who has organized a new club, its membership will consist of young men in and around Pittsburgh. Mr. Leach is very enthusiastic and intends building the club up to a high standard.

His letter to me reads as follows:

"The first meeting of our club was held last night and, although only six were present, we anticipate a larger attendance at the next meeting. We have decided to call it the Model Aeroplane Club of Pittsburgh, and will hold our elections at the next meeting.

"We will also open a campaign for new members in a short while, and will have an exhibition of models made by members of the club on display in the library here. I am making a model of the Orenco D-1 to a scale of 1¼ inches equal one foot for this exhibition, and several of the other members are working on racing and scale models for this event.

"We are also arranging a gala day for the Fourth of July, and will have contests for racing and scale types. I intend building a model Handley Page for this contest, and am working out a scheme for releasing five or six electric torpedoes by means of a fuse. I have experimented with this device before and found that the larger and heavier types of torpedoes failed to explode due to insufficient force of contact, as the model did not rise high enough. However, the variety known as electric torpedoes will explode if dropped a couple of feet and should prove suitable for my purpose.

"Most of the members of the club are interested in scale types rather than racing models, so we should do some good work along those lines. Please put a notice of the formation of this club on your model page, so that it may assist us in getting members.

"Until we have elected a secretary, I will have charge of all correspondence of the club.

"We will also probably subscribe to your weekly, as we consider it the best published. I have all copies of it published since July, 1919, and have placed them at the disposal of the members for use in obtaining plans of any types that are published in these numbers. If any previous numbers are wanted, we can obtain them at the Carnegie Library here, which has a complete file of your issues.

"I have been much interested in your articles on the construction of models, and have gained much information from them. I now use solid ribs, and consider them a great improvement over the bent ones." KARL S. LEACH.

I would advise every young man who is interested in model aeroplane competition living in or near Pittsburgh to write Mr. Leach in care of the Lubricating Metal Co., No. 11 Terminal Way, Pittsburgh, Pa.

More About Compressed Air Motors

The compressed air motor is surely coming into its own. This is proven by the number of inquiries I receive from readers daily and the demand for compressed air motors and complete models on the supply houses advertising in our columns.

The Wading River Mfg. Co. announces a new engine which has been perfected to a point where it develops its maximum power through one-half of its running time.

This is interesting when you stop to consider that a compressed air container or tank in a model has air compressed in it by a bicycle or automobile pump, to a pressure of up to 150 lbs. When the model is ready to fly the air valve is opened and the compressed air is allowed to flow into the cylinders at full pressure, which gradually lessens to zero as the tank is emptied.

The Wading River Co. have installed on their tank a throttling valve that keeps the air throttled to ¾ of its pressure for half the running time, when the valve is opened and the full remaining pressure is let in. This is a really good thing and should be an advantage when striving for distance records.

The construction of a compressed air motor is simple and many have been constructed by hand. One the writer made some years ago had fishing rod ferrules for the cylinders, the male ends acting as the pistons, the female as the cylinders. Tubing can be purchased in any hardware store, the taper pin for the valve and a taper reamer to ream the brass valve sleeve as well as any other parts, such as connecting rods, crank webs and throws, can be made from almost any scrap of metal lying around.

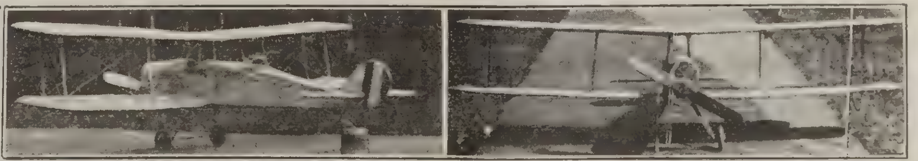
However, the hand-made motor has its limits and for efficient work I would advise the readers to buy them from a responsible firm if they cannot build them on a lathe.

More about compressed air motors will be said later, as I am anxious to have the Model Flyers of this country get together this summer in a country-wide contest for engined models.

Notice to Model Builders

I receive letters from model readers every once in a while asking for information regarding construction of parts or drawings showing different forms of engine beds, fuselages, etc. Of course, it would be impossible to make a drawing and write a description in answer to each question, but I would like the readers who have any such questions to ask or any suggestions to offer to do so now as I intend to run a series of constructional details within a month, covering the methods of construction used on different machines which will be of help to the model builder as well as the builder of large machines.

Send your letters to the "Model Editor."



A scale flying model of the D.H. 4 constructed by Henry Michowski of Detroit, Mich.

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

A Farmer's Letter to His Absent Sweetheart

(Under Modern Mail Conditions)

By James J. Montague

I like to get your letters, love, I miss you every day,
I'm dull and sad and desolate whenever you're away.
But if it's just the same to you, please make your missives light,
And don't enclose remembrances in everything you write.
This may seem trifling, darling, but it means a lot to me,
For they're using flying postmen on the R. F. D.

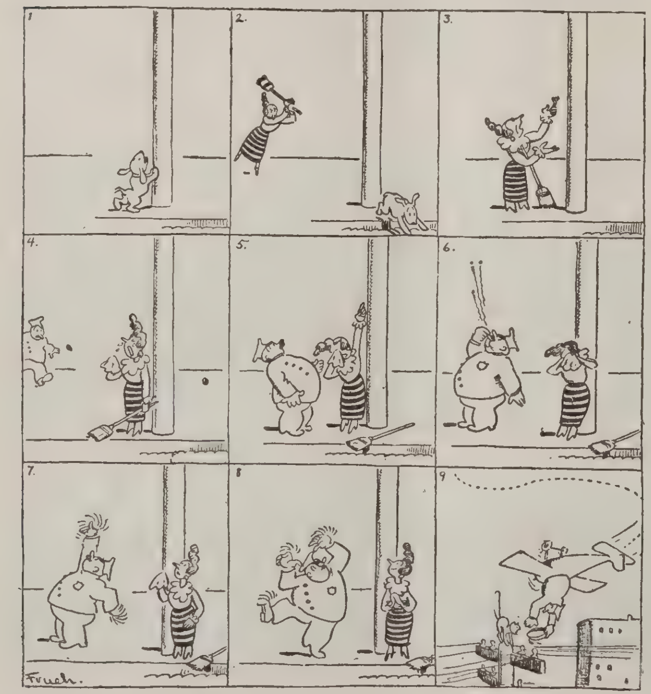
Last night a billet doux from you destroyed my Maltese cat,
Just dropped him, ruined in his tracks—the knife you sent did that.
The book of verse that you enclosed to me the other day
Impinged upon the hired man, and now he's gone away.
And hired men are very scarce these busy days to me,
And very hard to come by on the R. F. D.

That cigarette case was a dream, but it was my hard luck
To lean upon the letter box the moment that it struck.
And though I would have rhapsodized on getting it, no doubt,
My joy was somewhat dampened by the fact that I was out.
For when things fall they will fall hard, and when they light on me
I miss the dear old flivvers on the R. F. D.

I love you just the same, my dear, as in the days of yore,
And every day that you're away I miss you more and more.
But if you'll write a dozen sheets, instead of sixty-five,
When you return there'll be more chance of finding me alive.
For when it drops five thousand feet, the merest note, you see,
May croak your doting lover on the R. F. D.

—*The Naviator.*

MAYOR HYLAN'S SKY COPS



Courtesy N. Y. World

The Intercollegiate Air Race of the Future

Somewhere in the Clouds. About 1925.—The Yale-Harvard aerial regatta was staged to-day before the greatest crowd in its history. Conditions for the event were perfect. There was hardly a ripple in the air. A number of low-hanging clouds appeared in the offing just before the race started, but a big force of undergraduates who were acting as course patrols were detailed to brush them back.

Much difficulty was experienced clearing the course, which, as usual, became crowded with spectators. Despite all warnings, hundreds of private 'planes insisted upon anchoring in midstream, so to speak, and a number of excursion balloons were manœuvred directly into the path of the racers by the stupid skippers.

J. Oswald Lucre-Lucre, the millionaire aerial traction magnate, caused a deplorable scene by refusing to back his two-million-dollar aerial houseboat off the course. The committee and patrol 'planes were finally forced to threaten him with arrest; after which he reluctantly moved back.

Long observation 'planes lined both sides of the course. At 4.10, after much jockey for position, the starter's gun was fired and the race was on. The progress of the race by posts follows:

50-Mile Post—Yale leading by eight lengths.

75-Mile Post—Harvard has reduced Yale's lead to four lengths.

100-Mile Post—Both 'planes are neck and neck.

Finish Mark—Yale wins by a nose dive.

As the winning craft crossed the line the crews were seen to be in distress, and Harrollde, the stroke, was seen to collapse from exhaustion.

Harvard attributed her defeat to the fact that at the seventy-five-mile mark the Crimson 'plane got into some aerial eel grass, causing the engine to skip.

Yale also won the freshmen events and the gentlemen's four-oared jitney 'plane race.

There was much celebrating after the 'varsity race, the aerial bars doing a tremendous business.

The victorious Yale airmen built a bonfire on Mars later in the evening.

Tips to Pilots

Remember, in stunting, there are only two rules to follow: "Come out of the stunt before you get to the ground."

That's both of 'em—nuf sed.

Some Knock

Chief Hardy, standing on the beach, after having taken a hop in an N-9, was approached by Ensign Gavin.

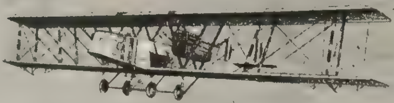
"Chief," said Mr. Gavin, "was that a knock in the motor I heard while we were up?"

"No, sir," said Hardy, "'twas my knees shaking."

Correct

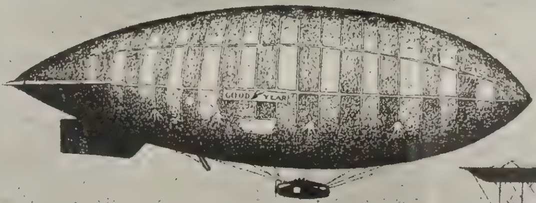
We saw an envelope recently with the following symbol, S.W.A.M.B.K.F.Y.S.M., which means, according to some of the artful lovers, "Sealed With a Million Big Kisses From Your Sweet Mamma." We can think of an envelope we would like to receive next pay-day with these initials, B.P.F.J.F.A.T.N.P.B.A.A.P., meaning, "Back Pay From January First According to New Pay Bill Approved and Passed."

West Virginia Aircraft Company

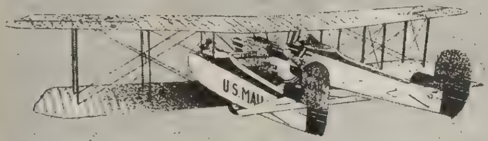

Glenn L. Martin Co.

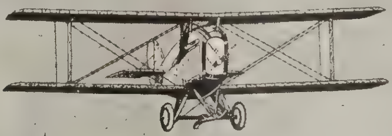
L. W. F. Engineering Co., Inc.

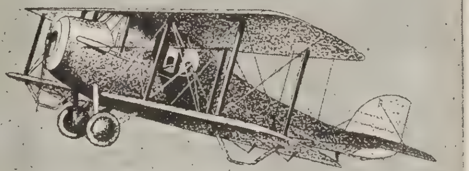
Curtiss Aeroplane Co.


Goodyear Tire & Rubber Co.

Aeromarine Plane & Motor Co.


Thomas-Morse, Inc.


Horace Keane, Inc.


Dayton-Wright Aeroplane Co.

Ordnance Engineering Corp.

The Aeronautical Exposition this year was also a Valspar Exposition. The best known makes of American planes were on view—*and every maker used Valspar.* These manufacturers know that Valspar best meets the exacting requirements of air navigation — so all these famous air-craft are

VALSPARRED, OF COURSE

VALENTINE & COMPANY
Largest Manufacturers of High-grade Varnishes in the World
ESTABLISHED 1832
New York Chicago Boston Toronto
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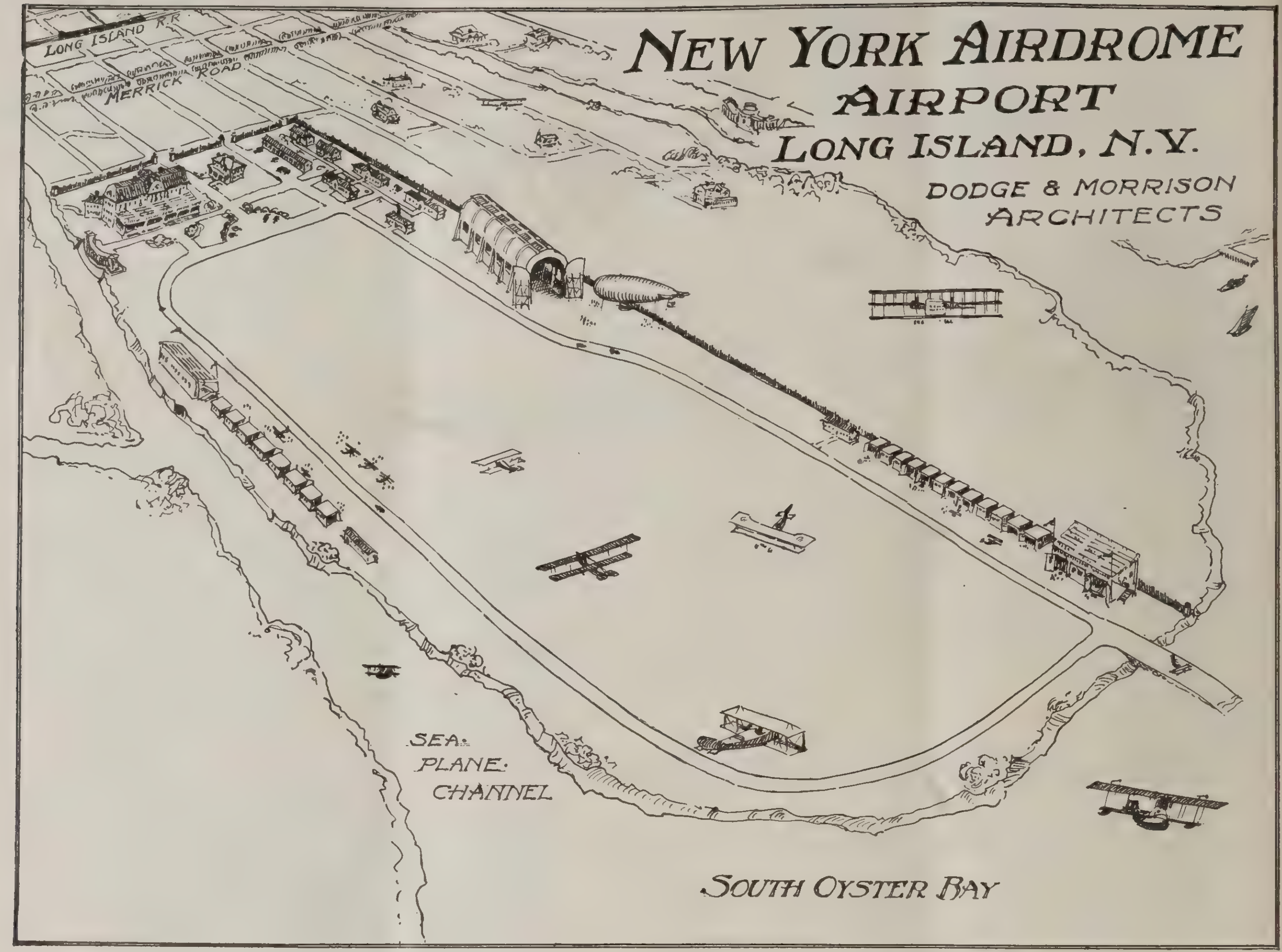
VALSPAR
The Varnish That Won't Turn White



FLYING FIELDS—FLYING BOAT AND SEAPLANE HARBOR—AIRCRAFT GARAGE

Objects: To provide properly organized Service of all kinds for Aircraft, including Living and Flying Facilities for Airmen and their Craft, Planes, Boats, Balloons, Dirigibles and for Aerial Racing, Touring and Expositions of all kinds.

For Manufacturers Demonstrations and Flying Instruction, and in Aviation Generally, Aerial Photography and Advertising, Land and Water alighting Facilities, Hangar and Warehouse accommodations, Repairs and Space Parts, Gasoline, Loading and Carriage for Goods, Passengers and Express, Ownership of such property as is necessary for the above purposes.

Establishment of Chains of Flying Stations for the control of and Supply of all such things as may be necessary to carry out all of the above purposes.

Location: Near South Oyster Bay, Long Island, New York; within easy reach of New York City (Pennsylvania Station) convenient to Rail and Road to the City.

Automobiles can reach it in forty minutes and have the Planes.

Ready for Flying on Arrival

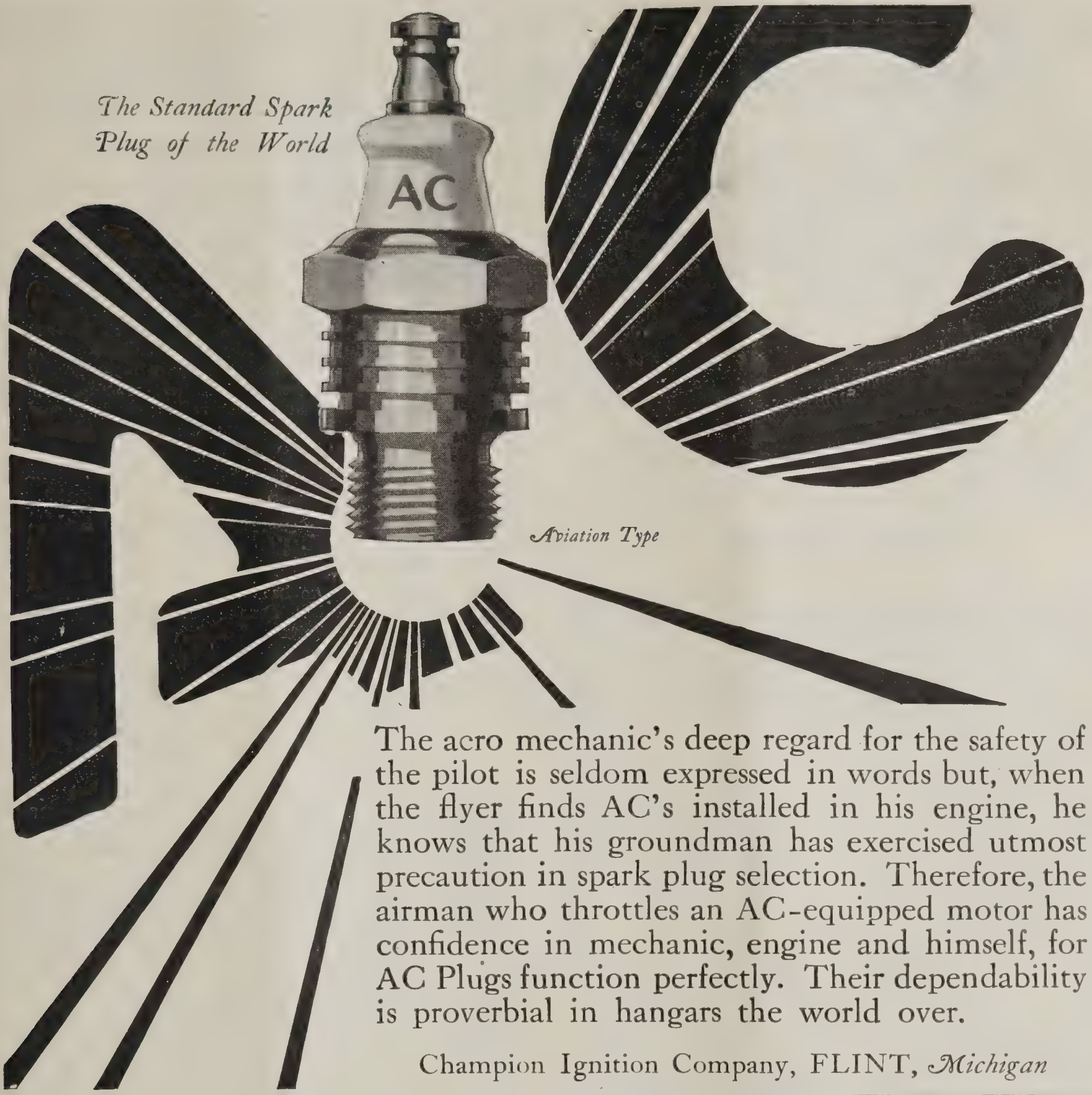
Management: Is composed of well known Fliers, Civilian, and Aeronautic Engineers, Experienced Photographers, Auto Garage Experts, Mechanics, etc., whose aim it will be to attain the maximum efficiency in every branch of Aeronautics.

Sports: Facilities are available to Patrons of the Airdrome as the locality is situated in the heart of a Boating, Swimming and Fishing Territory and there will be special Flying Privileges for them and their friends. Flying Instruction will be at their disposal in the Dual Control Ships stationed at the Airdrome.

Hangar Space

May be contracted for in advance by sending in the number, size and type of Aircraft, Pilots, Mechanics and other Personnel, present locality of Aircraft, when and for what period the space is desired. This information will necessarily be confidential and your accommodation will be prepared and ready well in advance of your requirements. Special efforts and terms to accommodate Manufacturers are being made. These may be had on application to

HAROLD A. DANNE
Engineer
41 PARK ROW
NEW YORK, N. Y.


The Standard Spark Plug of the World
AC
Aviation Type

The aero mechanic's deep regard for the safety of the pilot is seldom expressed in words but, when the flyer finds AC's installed in his engine, he knows that his groundman has exercised utmost precaution in spark plug selection. Therefore, the airman who throttles an AC-equipped motor has confidence in mechanic, engine and himself, for AC Plugs function perfectly. Their dependability is proverbial in hangars the world over.

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U. S. Pat. No. 1,135,727, April 13, 1915, U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

With this amount quite an ambitious scheme can be arranged. A workshop (always to be found in any locality) I consider to be an absolute necessity. It is useless to make Arcadia the clubhouse, especially on wet days, and a workshop can usually be obtained for about 3s. per week that will comfortably hold a bench, small stove, and a desk, with necessary impedimenta such as chairs. Members should be levied for the shop equipment, or guarantee to supply some such item equivalent in value to levy.

A small bench drilling machine (convertible into a hand brace), handsaw, fretsaw, flat and hollow woodworking chisels, metal-working files (flat and half-round), bench vise, plane (jack and smoothing), bradawls, small screwdriver, soldering apparatus, gluepot, small heating stove (if one is not supplied with workshop), oil lamps, chairs, table and hammer comprise the minimum equipment required. This will probably absorb £10, which could be taken from the entrance fees. The point to be borne in mind is that by charging reasonable entrance fees and subscriptions (those outlined above are well on the low limit) only a useful and energetic style of member is attracted to the club. While fees are kept below the margin necessary to enable useful work to be accomplished, so long will the style of member who is not disposed to over-exert himself be manifest.

And now for some remarks anent the actual running of a club. In the first place, ten members are the minimum, unless a smaller number are prepared to pay a larger fee to obtain the requisite capital.

The secretary should be elected at a meeting and also a treasurer. With clubs of more than fourteen members a committee would be necessary to arrange competitions and multifarious other matters. These should also be nominated.

Having formed the committee, the rules should be drawn up. These should not exceed six in number, and should be framed to settle the day and hour of meeting, etc., and to ensure that the club is a *live* one. Weekly flying of models should be arranged, with monthly competitions. A space should be provided on the card wherein such contests could be enumerated, and the committeemen's names entered on the front of card, with the club's name and secretary's address. The culb, too, should become affiliated with the K. M. A. A.; this costs £1 1s. per year. The secretary should arrange lectures on matters relating to aeroplanes, the lecturer in each instance being a member of the club. He should also keep minutes of each meeting, and in collaboration with the treasurer be responsible for a yearly balance sheet and statement of the club's progress. Books should be accurately kept of expenditures, etc.

The one thing I wish to impress is the need for zeal and interest in the movement, and not merely a superficial interest in the "flying stick."

Transcontinental vs. "Logging Roads"

Three of the greatest transcontinental roads in the country run through the home State of Mr. Ryan. They are built around, over and through high mountain ranges, across the Great Divide, through heavy construction of many costly cuts and tunnels, with expensive bridges across the Missouri, the Yellowstone and other rivers, great and small. Probably no railroads in the country average higher construction cost than those in Montana. The laws of that State (sec. 2502) require all roads to be assessed at their full cash value. The commercial road thus valued ordinarily includes the rights of way, stone ballast, heavy rails, telegraph and telephone lines, locomotives, cars and other rolling stock, depots, shops and franchises. These elements are usually absent or extremely small in logging roads.

In Montana the following assessed valuations of the three roads are reported:

	Per Mile
Northern Pacific (main line)	$56,000
Great Northern (main line)	56,000
Milwaukee Railway—electrified (main line)	55,325
Milwaukee Railway—unelectrified (main line)	50,728

Five logging roads to haul aeroplane logs in Washington and Oregon built by Col. Disque under Director Ryan averaged a cost to the Government of $107,000 per mile, or practically double the assessed full cash value of three great transcontinental roads in Mr. Ryan's own State, with one of which roads he was closely connected.

Squandering Money on "Logging Roads"

Government logging roads are valued without equipment because they do not own even a hand car. The transcontinental road valuations include locomotives and other rolling stock equipment estimated by some authorities at 40 per cent of the whole valuation. Deducting 25 per cent, a conservative estimate for equipment, to reach a basis of comparison, leaves net values of the Northern Pacific, Great Northern and Milwaukee Railroads, respectively, of $42,000 and $37,500. However, another factor enters into the comparison. Heavier rails, rock ballast, complete telegraph and telephone equipment, expensive terminals and expensive mountain construction undoubtedly make cost of reproduction of transcontinental roads in Montana practically double that of any Government logging road inspected by your committee on the coast.

On a basis of $37,500 per mile valuation for the Milwaukee road, exclusive of equipment, none of the Government logging roads apparently ought to have cost much over one-half of the above figures. The Carey logging road of thirty-six miles main track, without terminals or equipment, as a matter of fact cost the Government $4,000,000, or $110,000 per mile.

Of the thirteen spruce roads only three will be briefly discussed, to wit: Nos. 1, 11 and 12.

No. 11 is a road of 10.8 miles completed length, main line, which cost $1,553,665, or about $140,000 per mile, including sidetrack mileage. This road was the occasion of much criticism by many witnesses. The timber in the Siletz district reaches from 10,000,000,000 to 20,000,000,000 feet, according to the testimony of Welch (p. 1870), Hall (p. 1728), Wade (p. 1833), Storey (p. 1809) and Ball (p. 1725). Six witnesses testified that a road 15 to 20 miles long extending north from Toledo located on the Yaquina River would reach 550,000,000 feet of spruce and an unlimited amount of fir. These witnesses were loggers, mill men, or reputable cruisers who were familiar with the region. Several witnesses, including engineers who had made surveys, testified an extension of such road north from Toledo could be made on less than a 1½ per cent grade and at a cost of from $15,000 to $20,000 per mile, according to the average price paid in such construction.

(*To be continued*)

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(*Continued from page* 441)

trial flight until two days before the great Warnemünde race planned for August of that year. All those who took part in the preparations for that race, which was postponed owing to the outbreak of war, will still remember the splendid and startling performance of this boat, which was piloted by the late pilot Stagge, who, by the way, had never flown a seaplane before. So absolutely "right" was this boat that it could be taken over by the Navy without any alterations whatever, and not long afterwards, piloted by Stagge, it was flying over Dover.

It was not long before a demand arose for larger and more powerful boats, and the Oertz Works received an order for a series of flying boats, which were to be fitted with 260 h.p. Argus engines. Delivery of these engines was much delayed, and when they were available they proved to have exceeded the estimated weight to such an extent that it was quite out of the question to fit them in the Oertz boats. It was, therefore, decided to fit instead the 240 h.p. Maybach airship motors, which were at that time quite new. This was done and in the autumn of 1915 the first of these boats could be delivered. In spite of the fact that the boats were really too large for the engines' power, which was lower than that for which they were designed, and that the engines were heavier than had been the estimated weight of th Argus engines, the boats were able to pass their acceptance tests. One of these boats is shown in Fig. 3.

Fig. 4 shows an Oertz flying boat specially designed for the 240 h.p. Maybach engine. This machine was presented to the Navy by Messrs. Krupp von Bohlen and Halbach. All previous experience was taken advantage of in the design of this boat, and especially was the step question solved successfully. The wing tip spring boards were replaced with small, low resistance wing tip floats. The actual performance of this boat exceeded the estimated figures, the speed being 87 m.p.h. as against the estimated speed of 80 m.p.h. This made the Oertz flying boat the fastest in the German Navy.

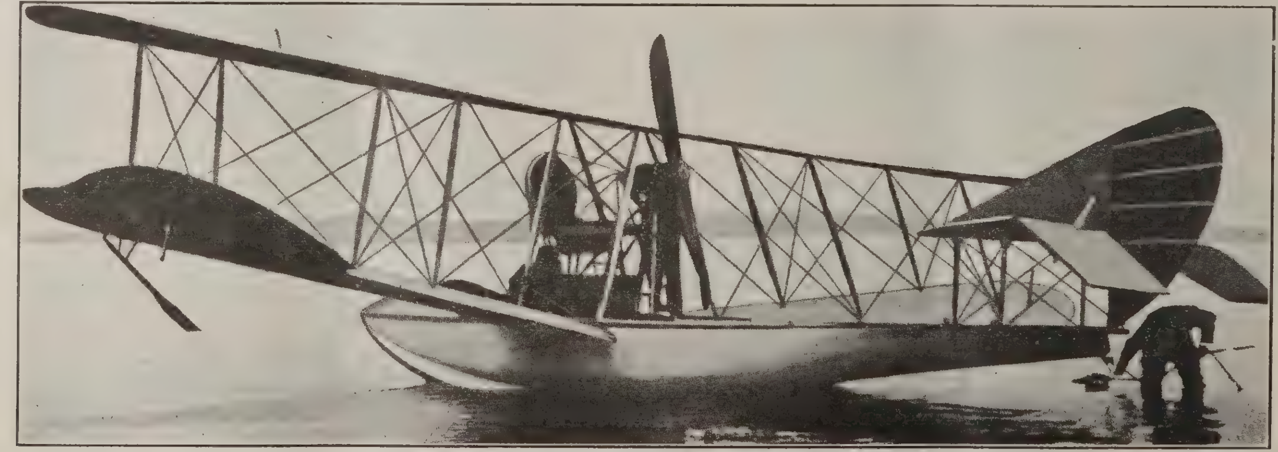

Fig. 5—1914 type Oertz flying-boat, 160 H.P. Daimler engine

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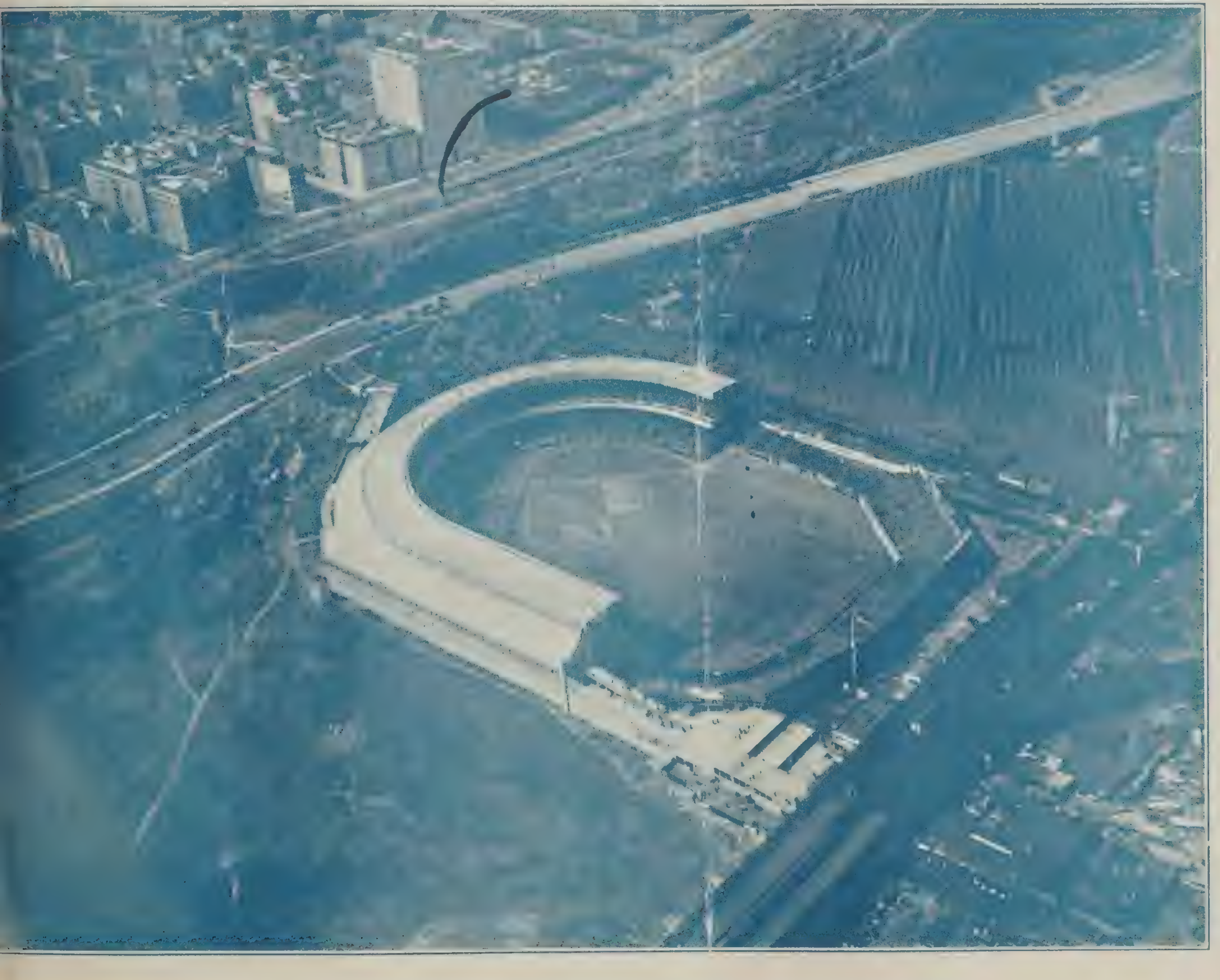

An Airscape of the Polo Grounds, New York, Taken From a Curtiss Oriole

Committee Organizing First Aerial Derby Around the World Receive Cordial Reception in France

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In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

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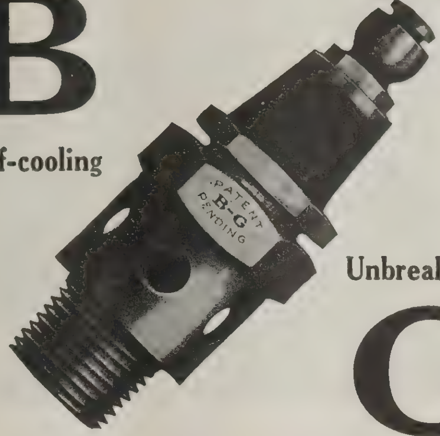

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VOL. XI JUNE 14, 1920 NO. 14

TABLE OF CONTENTS

PAGE

Committee Organizing First Aerial Derby Around the World Receive Cordial Reception in France..... 469

The Naval Aviation Appropriation 470

Rounding the World............. 470

The Aircraft Trade Review....... 473

Circumaviating America in Avro.. 474

Fabric Fastenings................ 474

Book Reviews................... 475

The Investigation of Aircraft Radiators at the Bureau of Standards.. 476

The Italian Semi-Rigid Airship Roma 478

Naval and Military Aeronautics... 479

Foreign News.................. 480

Elementary Aeronautics and Model Notes 481

Aeronitis 482

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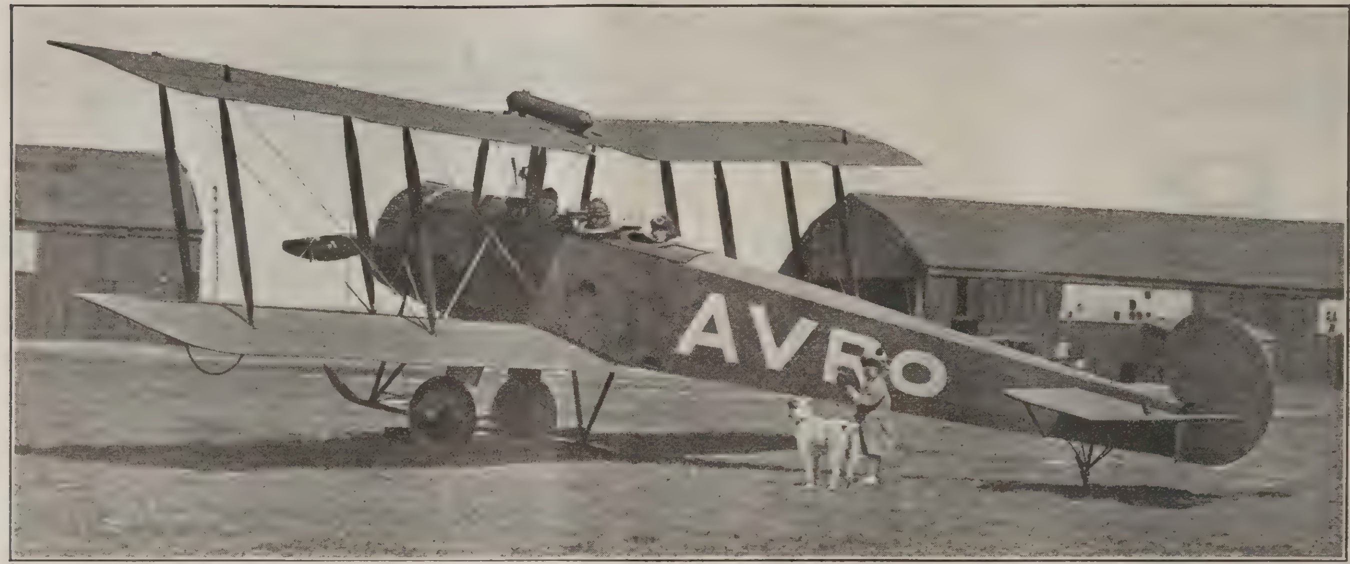

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COMMITTEE ORGANIZING FIRST AERIAL DERBY AROUND THE WORLD RECEIVE CORDIAL RECEPTION IN FRANCE

THE Commission of the Aero Club of America and the Aerial League of America organizing the First Aerial Derby Around the World, consisting of Commodore Louis D. Beaumont, Major Charles J. Glidden, and Benjamin Hillman, which started from New York on October 8 and, after presenting the plans for the Derby to 49 important American cities, sailed from San Francisco on November 3d, has visited Japan, Corea, Manchuria, China, India, and all of the continental European countries, is now in France, where their journeyings has been a series of ovations. In every country visited the Commission has been fêted officially, and every possible co-operation rendered in their arrangements for the most stupendous aeronautic event ever attempted.

At the reception tendered the Commission by the Aero Club of France, Commodore Beaumont gave an interesting resume of the world tour. His address follows:

"As President of the Commission entrusted with the preliminary survey and organization of the First Aerial Derby around the world, I wish to express the great pleasure it is for me to extend to you the greetings of the Aero Club of America, the representative in America of the Federation Aeronautique Internationale, and those of the Aerial League of America.

"The news of the death of my good friend—Monsieur Deutsch—(dela Meurthe) reached me when in the Orient, and caused me much sorrow, and now I have to greet you—his successor—whose name has been so closely identified with human progress in recent years, and whose latest generous contribution toward increasing the factor of safety in aviation has been so universally appreciated.

"Upon the eve of dissolving this preliminary Commission which has now served its purpose as a path-finder, it is my pleasant duty to extend to you a hearty invitation to participate in our proposed contest, the aim of which is to open the airways of the world and to further the cause of aerial transportation.

"I know that many of those whom we met during our journeys would be glad to add their greetings to mine were they aware that I have this opportunity of presenting them to you.

"I would like to say that the object of our Commission in girdling the globe was not only to place before the various authorities with whom we came in touch the plans of the proposed Derby, but more generally to advance the cause of aeronautics on all lines and to encourage aerial endeavor in all parts of the world.

"The great propaganda which aviation received during the war, through the accomplishments of the fighters of the air, and in particular, those of the flying soldiers of France, did much to facilitate our work. Among the many cordial receptions extended to our Commission, none was more cordial and more appreciated than that received at Saigon, your great outpost in the East, where I had an unexpected pleasure of coming across several of your countrymen whom I had met in Paris during the war.

"We have received much help and great encouragement from the press in all countries. The newspapers of the East readily printed all data we could give them on aeronautical questions and are earnestly preparing public opinion for the great developments the future has in store, and I would like to say here how fully the great role France has played in aeronautical history is understood and appreciated throughout all lands. It is well recognized that your country is a leader in this form of progress—but *nowhere* is this more recognized than in America, and that is why we are so anxious that you should cooperate with us in this undertaking of ours.

"One of its earliest results, we hope, will be the extension of the aerial mail services throughout the world. This is a question in which we in America are much interested. Perhaps you will be glad to know in this connection that our aerial postal service, which already extends from New York to Chicago, will shortly reach to Omaha and San Francisco, a distance of nearly 6,000 kilometres, and also via Atlanta, a distance of nearly 3,000 kilometres, and also from the Atlantic seaboard to the Pacific—6,000 kilometres.

"We know what has been done in France in this line, in fact, it is the lead of France which we have followed.

"As regards the organization of the Aerial Derby, we would be especially grateful for suggestions from the various national aero clubs, and in particular from the dean of them all, the Aero Club of France, with its long and successful experience in aeronautic sport, as to the rules to govern the contest. A tentative set of rules has already been submitted to you, and we would be glad to have criticism, specially constructive criticism, which would afford us valuable suggestions.

"Upon the rules being decided upon, we will submit them to the F. A. I. because of the many countries involved to obtain their acquiescence.

"We had hoped, at one time, to hold the event this year, but we quickly perceived that the difficulties of organization precluded this possibility and it is our intention to hold it in 1921.

"I will not take up your time with a detailed account of the Commission's progress around the world; suffice to say that, leaving New York on October 10th last, it has traveled over 50,000 kilometres since then, visiting all the countries on the proposed route and coming in touch with all the authorities liable to be of use to us from an administrative or technical standpoint in these countries.

"We have published bulletins of our progress from time to time which have been and are being translated into French, and from which you could glean, no doubt, interesting data concerning the aeronautical movement in distant countries.

"We like to believe that the passage of our Commission through the United States, through Japan, through China, through your Indo-China, through the Dutch East Indies, and through India has added stimulus to the movement in these countries and we can certainly testify to the enthusiasm shown everywhere on the question. As a direct result of our voyage, nine new aero clubs will spring into being in the East, including the new Aero Club of China, that country of mystery where a quarter of the earth's population is now awakening from its thirty centuries lethargy.

"In closing, I would like to express the earnest hope that the various nations will be drawn into closer communication and association through the development of international aerial intercourse, thus tending to avoid a repetition of the recent five years horror, and to express the belief that in the control of the air lies the greatest guarantee of peace.

"It is especially pleasant to express this sentiment in the heart of France, beneath whose fields lie 1,500,000 of her dauntless sons, and in particular those aces of the upper regions who have been such an example to us all.

"Monsieur le President de l'Aero Club de France, those who know me know how I love your country; my heart goes out to you, and I would like to give concrete expression to this affection in begging you to accept my contribution of one hundred thousand francs to your subscription for the widows and orphans of the aviators who died for France."

THE NAVAL AVIATION APPROPRIATION

COMMENTING on the Naval Appropriation Act for the fiscal year, Secretary Daniels discussed the appropriation for Naval Aviation as follows:

"The country will be seriously disappointed in the provision Congress has made for increase and development of aviation. I believe the people wish to see America take the lead in aviation progress so that it may become soon one of the, if not the first, offensive in naval warfare. The appropriation for naval aviation contained in the bill is only twenty million dollars. How can we lead in this greatest of modern agencies upon such a small appropriation. We will do all we can and make all the progress possible, but in the main we will be but marking time as to any daring and forward development until Congress has the vision to appropriate sufficient money to enable the United States to take the proper place in the development of air navies.

"During the World War the efforts of Aviation were particularly intensified in order to assist the armed forces operating on the land. Because of the nature of the struggle, every effort of the Allied powers was directed toward the suppression of the submarine, and to this end, Naval Aviation was primarily employed over the narrow waters separating the belligerents.

"Only toward the close of the struggle, the navy of Great Britain began to find a place for the new art with the battle fleet. War gave Aviation a definite role in conjunction with the operations of capital ships which it retains today. Glancing behind at the wonderful progress of science in the past quarter of a century, it requires but slight foresight to predict an aeronautical development which may completely revolutionize present conceptions of the strategy and tactics of war at sea, and have a far-reaching influence upon the design of warships.

"The perfection of the new arm, which promises to be so far-reaching, is a matter of supreme importance, not only to the military and naval man but also to the tax-payer, on whom the sailor and the soldier depend for their support and for their progress.

"It is well perhaps, to review what has been done by the Congress which has just closed its doors, to encourage and to develop this new art, and to permit the continuation of the investigation of problems involving its application for Naval uses.

"As I have said a total of only $20,000,000 has been appropriated for Naval Aviation. It will be possible during the next year to procure a total of about one hundred planes for the purposes of the Navy and the Marine Corps and a total of 38 Lighter-than-air machines of various kinds. Considering the life and the experimental nature of flying craft in general at this time, these numbers can not be considered adequate, nor are they sufficient to insure to the United States a progress which will permit this country to assume a position abreast the leaders in the art of aeronautics. With this sum it will not be possible to continue the construction of rigid airships during the next twelve months and as the development of the rigid, shown to be essentially a Naval unit, during the World War, has been placed in the hands of the Navy, the service feels keenly the curtailment of funds for this purpose.

"For scientific investigation, the development of new types of planes, new ideas in construction, the use of metals instead of wood or fabric, and improvement in engines upon which the advancement of Aviation so largely depends, but minor sums, entirely inadequate, have been made available. In this country we lack the aerodromes and aviation facilities widely created abroad during the war. Flying is impossible on any great scale until these facilities are first constructed, and considerable sums of money must necessarily be expended before the airship, with safety and assurance, can blaze its path in the heavens. Congress has granted but little money for the construction and maintenance of such facilities, and has given nothing which will provide vessels permitting the conveyance of aircraft in numbers with the fleet.

"Not only has Congress failed to appropriate sums sufficient for the needs of Naval Aviation, but it has attempted, through a clause inserted in the Army Appropriation Bill, to limit the coastal and overseas activities of Naval Aviation. The effects of these apparently innocent words in question will not be vital, insofar as the Navy is concerned, but in the event of war results would be quite different. In framing this legislation the existing and approved policies of the War and Navy Departments for the defenses of the coast have been entirely ignored. Over-ruling the objections of the War and Navy Departments, and without a precedent, the Congress assumed the responsibility of including in a bill appropriating for the support of the Army a provision of far-reaching and unwise effect on the policy for the naval national defenses of the country. This action was without consultation with the other departments of the Government interested in the matter, and despite the protests of both the Secretaries of War and of the Navy. It is my purpose to appeal to Congress to reverse this action which is an unnecessary and unwise limitation upon naval efficiency in aviation.

"Today we read in the recently published statement of the First Lord of the British Admiralty, with regard to the United Air Service as organized in England during the war, that

> "The Admiralty have represented to the Air Council that, in their opinion—
>
> (a) the operations of all aircraft flown from H.M. ships and vessels with whatever object in view, that is to say, not only reconnaissance and artillery observation machines, but also machines which are carrying out operations in the air for offensive and defensive purposes; and
>
> (b) all operations carried out by aircraft not flown from ships, but which are being carried out in connection with the command of the sea, that is to say, operations for oversea reconnaissance and for the attack of enemy ships and vessels—
>
> should be under naval control. Dual control would be unworkable. In all matters relating to the command of the sea the Admiralty are and remain the responsible authority.
>
> * * * * * *
>
> So far as can be foreseen, naval requirements will be met by the proposal ultimately to form a naval wing under the Air Ministry, with a personnel specially trained for naval work."

"In the United States at present, instead of proceeding to give to the Army and to the Navy what these organizations deem necessary for their progress in the development of aeronautics, the Congress has wasted much time and effort to effect a unification of the military and naval air services with civil organizations in a way which can not be satisfactory to either military, naval or civil interests. The Navy must have its own organization, and the sooner this fact is accepted and it is made possible to proceed with an advancement along the lines indicated as necessary by Naval Experts, the more rapidly and satisfactory will be our progress, and the greater will be the economy to the Government in the new development. I appeal to all who believe in the possibilities of aviation to aid in securing well considered legislation and adequate appropriations at the December session. The Navy will do all it can with the present facilities and money, confidently looking forward to practical appreciation of the commanding importance of aviation when Congress next convenes. In fact we are already making large plans in keeping with the conquest of the air for presentation in December."

THE NEWS OF THE WEEK

$250,000 Suit for Damages Started Against New York Evening Post By Henry Woodhouse

A suit for $250,000 damages has been started in the Supreme Court, New York County, against the New York Evening Post, Inc., publishers of the daily newspaper the New York *Evening Post,* by Mr. Henry Woodhouse. His attorneys are Messrs. Beekman, Menken & Griscom. Mr. Woodhouse, who is a member of the Board of Governors of the Aero Club of America, is the editor and owner of AERIAL AGE WEEKLY, "Flying" (monthly) and other publications, and author of the "Textbook of Military Aeronautics," "The Textbook of Naval Aeronautics," "The Textbook of Applied Aeronautic Engineering," "The Aero Blue Book," "The Textbook of Aerial Laws" and other publications.

Mr. Woodhouse stated that, as would be fully demonstrated in this suit, he has been made a victim of a series of misstatements recently published in the *Evening Post,* and that he feels that his public record and standing for many years has been such that an investigation by the *Evening Post* before the publication of the article in question would have satisfied that newspaper that its information was wholly unreliable.

French Aeroplane Sets New Non-Stop Record

PARIS,—The aeroplane Goliath, piloted by Lieuts. Bossoutrot and Bernard, broke the world's record for continuous flight last week, the aeroplane being forced to discontinue its non-stop trial only after it had remained in the air 24 hours 19 minutes and 7 seconds, covering a distance of 1,189.33 miles.

The Goliath also established what are claimed to be records for 1,000 and 1,500 kilometres, making the former in 11 hours 29 minutes and 56 seconds and the latter in 16 hours 42 minutes and 8 seconds.

The flight was made at Etampes, near Paris. The former record for continuous flight was held by the German, W. Landmann, who remained in the air 21 hours 48 minutes and 42 seconds in June, 1914.

Start Seattle-Alaska Aerial Service in July

An aerial transit line linking Alaska with Seattle, Wash., which will save five days' travel, is to be inaugurated July 1, according to E. N. Gott, vice-president of the Boeing Airplane Company, of Seattle. Mr. Gott recently arrived in New York on his way to Washington, where he will confer with government officials with the new service.

The initial flight will be undertaken between Seattle and Skagway, a distance of 1,000 miles. The only communication so far is by steamship, which requires from four to five days to make the voyage. It is expected to take only ten hours flying time for the trip by air. The object of the service is to facilitate the transportation of mail, express matter and passengers to and from Alaska.

Later the route will include a short cut course from Skagway along the Yukon river to St. Michaels and Nome. Both these routes lie over mountainous territory, where it is impossible to construct railroads. The mountains vary in altitude from 2,000 to 11,000 feet.

The first flight will be made in a seaplane equipped with a 220-horse power motor.

R-34 Plans Flight from Rome to Buenos Ayres

The dirigible airship R-34, which in 1919 flew across the Atlantic from England to New York and back, has had a trial flight in Rome and shortly probably will attempt a flight from Rome to Buenos Aires.

The airship has a capacity of 50,000 cubic meters of gas and instead of a basket carries an aluminum compartment capable of accommodating one hundred passengers. If the trip is made the pilots will be civilians.

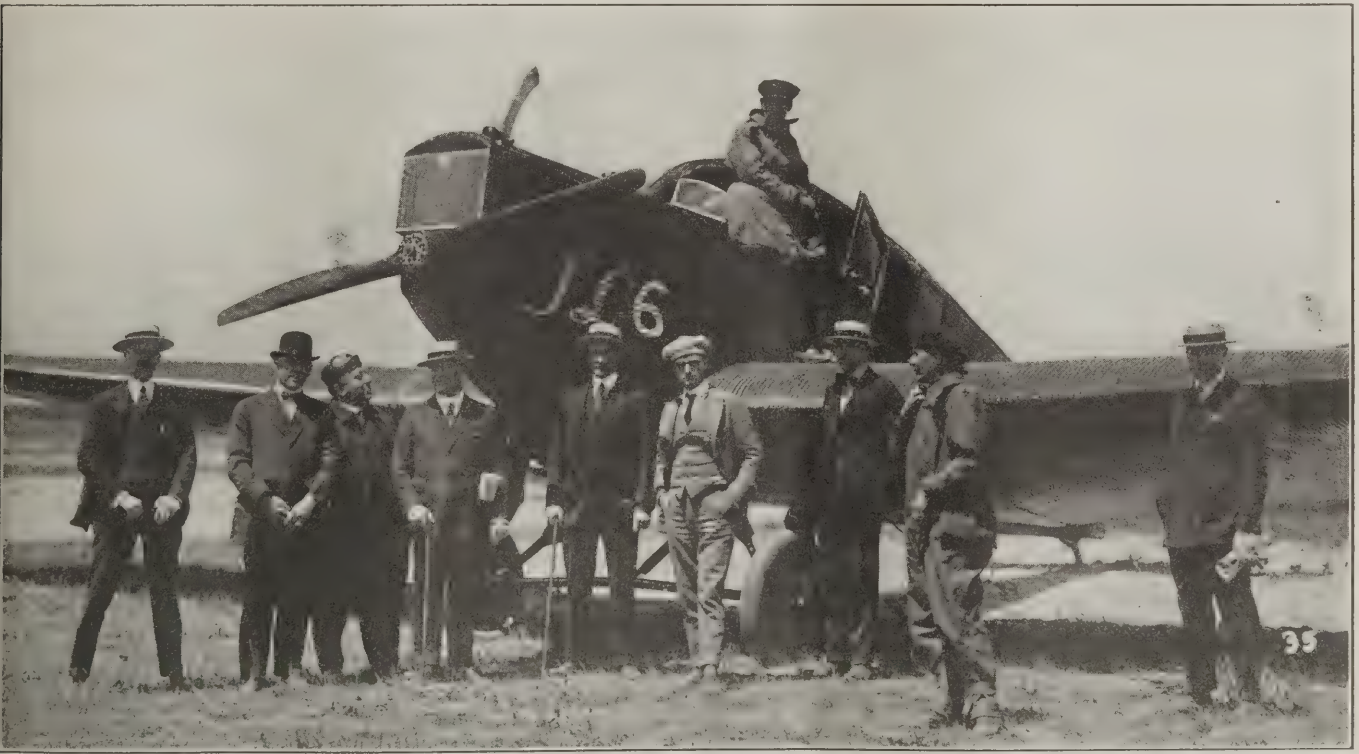
The R-34 was built by the British army. A dispatch from London last December said that a combination of aviation firms was credited with the intention of acquiring the R-34 and her sister ship, the R-39, and that a weekly airship service to America was contemplated. The vessels, it was said, were being altered to meet passenger and cargo requirements.

New York-Nome Flight Set for July

Edmonton, Albe.—Edmonton will be the chief Canadian base for the flight which four United States army aviators will make next month from New York to Nome.

One purpose of this expedition is to establish a military air route across the continent. Another is to furnish experience in surmounting difficulties such as can be presented only by a flight of this kind.

The aviators plan to cross the border near Portal, North Dakota, making their first landing in Canada at Saskatoon. They will cover approximately 2,500 miles on the journey.



The all-metal JL6 monoplane which created great interest at the Third Pan-American Aeronautic Congress. Left to right: Mark Ovenden, Mayor Thos. S. Baldwin, John M. Larsen, Alan R. Hawley, Commander C. C. Witmer, U.S.N.R.F., A. D. Smith, Commander M. Utgoff, Mr. Conklin, and Bert Acosta, the pilot, standing on the wing

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Rectors View Parishes from Air

Capt. J. V. Dallin, chief pilot of the Aero Service Corporation of Philadelphia, Pa., recently took up the Rev. Croswell McBee, rector of the Episcopal Church at Lansdowne, Pa., and the Rev. Robert Norwood, rector of the Memorial Church St. Paul, at Overbrook, Pa., to initiate them into the joys of sky piloting and show them their churches and parishes from above.

Both rectors were very enthusiastic over their experience and voluntarily enlisted in the ranks of aeroplane boosters for the advancement of flying in all its branches.

Balloon Sails From Virginia to Staten Island

Lieuts. George Storer and John Mullen of the Army Balloon Station near Hampton Roads, Virginia, made a flight in a balloon recently, landing at Prince's Bay, Staten Island, N. Y., after four hours in the air.

The distance from Hampton Roads to Prince's Bay is 347 miles, and their balloon must have traveled almost at aeroplane speed—86 miles an hour.

When they got several hundred feet aloft, they found their balloon in the grip of a gale that rapidly bore them north and east out to sea. After two hours or more of this drifting the balloon was off Barnegat, N. J., when the wind veered to the southeast and blew them back shoreward.

Chattanooga Club Active

The Aero Club of Chattanooga, of which John E. Lovell is President, is doing excellent work locally for the advancement of aeronautics. The club is endeavoring to organize the city of Tennessee and to establish landing fields in the more important centers for the benefit of air tourists.

Mr. Lovell has already made a series of flights radiating from Chattanooga and has made recommendations to the club concerning suitable landing places.

Mr. Lovell reports that Marr Field, the Chattanooga Air Port, is in excellent condition and plans have been completed for the reservation of air travelers who might be in the vicinity.

Zeppelin Officials Arrive in New York

Three high officials of the Luftschiffbau Zeppelin Company, Friedrichshafen, Germany arrived in New York recently. They were Alfred Colsman, general manager and head of the company; William E. Dorr and Otto Milatz, directors. Accompanying them was Commander Meyerbacher, U. S. N., who has been abroad to get technical pointers regarding the big rigid dirigibles, in which the navy is now greatly interested.

Reduce Rail Rates on Planes

Washington—Reduced rates on aeroplanes, flying boats or hydroplanes, loose, and in carloads, have been authorized by the Interstate Commerce Commission on application of carriers for which R. C. Fyfe, J. E. Crossland and R. M. Collyer, respectively, are agents. The reduced rate schedule must become effective before Aug. 1.

Aerial Convention is Signed by U. S.

Paris—Ambassador Wallace, acting with full power from President Wilson, under instructions from Washington, signed the aerial convention and protocol in connection with section 313 of the Treaty of Versailles and section 276 of the Treaty of St. Germain, making certain reservations, however.

The Allies signed the convention last October. When the six months' limit expired in April the protocol was added and the time extended to June 1.

The reservations of the United States concern the question of private aircraft flying over restricted areas, the United States reserving rights for flying over its territory, and also customs and the right to enter into conventions with nations of the Western Hemisphere, including Canada.

Shaw Flyers in Staten Island

The Shaw Flyers have been doing much flying at Sunset Hill, Staten Island, N. Y., and much interest has been aroused there by them. Lieut. G. W. Shaw, U. S. N. R. F., Lieut. G. L. Bradford and Theodore T. Lovington comprise the company. A large number of persons took flights with them.

The Shaw Flyers will make a tour of the east and stops are planned at Poughkeepsie, Newburg, Danbury, and Norwalk, Conn.

K. M. Turner Elected President of Aero Club of Southern California

Mr. K. M. Turner, the newly elected President of the Aero Club of Southern California, is one of the real "pioneers of aviation." His interest in seeing the United States take a leading part in conquest of the air dates back more than fifteen years, and since 1906 he has given a great deal of time and money toward encouragement of flying. He was one of the group of men who were enthusiastic supporters of flying in the early days of the Aero Club of America, and since the establishment of that Club he has taken an active part in its affairs and in international aeronautic work.

Mr. Turner is vice-president of the Aerial League of America and a member of the Aeronautical Map and Landing Places Committee and of the Technical Committee of the Aero Club of America.

Mr. Turner has taken numerous air trips in different types of aircraft, and has observed the qualifying flights of many licensed pilots. His first aeroplane ride was in 1910 in the old model Wright biplane. He was one of the first passengers to be carried in a Curtiss flying boat.

Upon retiring from active business, Mr. Turner and his family moved to Los Angeles, but he had been too actively engaged in business life to give up work and soon after making his home in California, he organized the firm of Turner, Kuhn and Frazer, now among the largest cotton brokers in the West.

Mr. Turner firmly believes that Southern California can be made one of the greatest aeronautical centers in the world and his sole interest in the Aero Club of Southern California is to see that accomplished.

Above: Messrs. John P. Davis and C. S. Jones, of the Curtiss Aeroplane & Motor Corporation, who made three flights to Atlantic City during the recent Pan-American Congress. Also shown are Colonel Hickham, representing Secretary Baker, and Messrs. Alan R. Hawley, Henry Woodhouse and Major Baldwin

To the left: Mr. and Mrs. F. G. Ericson, of Toronto, and Baby Lorraine Ericson, the youngest participant in the Third Pan-American Aeronautic Congress

The AIRCRAFT TRADE REVIEW

Macomber & Whyte Rope Co. Now Macwhyte Company

The corporate name of the Macomber & Whyte Rope Company, Kenosha, Wisconsin, has been changed to Macwhite Company, effective June 1, 1920.

No change in ownership, management, or policy of the company is involved.

As the products of the Macwhite Company have for several years been known and advertised under the trade name, "Macwhite," the change brings the name of the company into line with the name of the products.

The Macwhite Company manufactures not only wire rope, but also streamline wire for aeroplanes.

Mr. George S. Whyte continues as president and general manager, Mr. Jessel S. Whyte as secretary, and Mr. E. W. Reitzel as treasurer.

Titanine to Expand

Mr. E. G. Davis, manager of Titanine Inc., (American Branch) announces that plans have been made for the expansion of the company's manufacturing facilities in America, and statements made recently that Titanine had decided to suspend their manufacturing activities here are absolutely unfounded.

Valentine Gephart, Ltd., Has New Factory

The firm of Valentine Gephart, Ltd., of Kansas City, Mo., announce their removal to their new aircraft factory on Brush Creek Boulevard.

They are now equipped to build all types of heavier-than-air craft and are devoting a large space for rebuilding crashes. A complete stock of parts and motors have been obtained. The owners of the company are Valentine Gephart formerly attached to the 37th Escadrille de Chasse, Beconcourt, France, and R. H. Hawley of the Utah Copper Co., Salt Lake City, Utah. They are distributors for the S. P. A. D. and Breguet aeroplanes, and the Lorraine-Dietrich engines.

Six Aeroplanes Delivered to Spokane Agents

Spokane, Wash.—Two carloads of new Curtiss Standard aeroplanes have been received by the Symons-Russell Aviation Company. There are six machines in the shipment. The planes are equipped with Curtiss OX-5 motors of 90-horsepower. They will be sold in the Inland Empire, where the Symons-Russell Company has the agency for Curtiss products.

Calibration of Barographs Used by Major Schroeder

The two 34,000 foot barographs used by Major Schroeder in his high altitude flight of February 27, 1920, were investigated by the Bureau of Standards not only for the purpose of determining the atmospheric pressure reached at the ceiling of Major Schroeder's flight, but also to determine the change in calibration with temperature. The results were compared with those obtained from tests conducted last September and the instruments were found to repeat within the experimental error. An interesting part of the investigation consisted in giving the instrument two flight-history tests.` These tests are based on the assumption that a well-seasoned instrument will always give the same indications when subjected to identical conditions. The test consists in putting the instruments in a chamber where the air pressure and temperature can be varied in exactly the same way as they varied during the flight; or, in other words, the pens of the instruments are made to follow the trace on the charts recorded during the flight. As the temperatures experienced by an aeroplane at such high altitudes are lower than those which can be obtained by an ordinary refrigerating system, it is necessary to use carbon dioxide apparatus to produce the lower temperature within the chamber. The temperature test of these instruments is very important because from them temperature-pressure correction curves may be computed and if it is found that the temperatures observed by the pilot during the flight are in error, these curves provide a means of correcting them. They can also be used to compute the most probable altitudes of any future flight. If it is not possible to carry out a new flight-history test.

Form Curtiss-New York Aircraft Corporation

The latest addition to the list of Curtiss distributers is the Curtiss-New York Aircraft Corporation which has been given exclusive sales rights for New York State outside of the metropolitan district.

J. P. Davies, who was general sales manager of the Curtiss Aeroplane and Motor Corporation from December, 1918, to March, 1920, is president and general manager of the new company which has opened offices in New York and Buffalo. As sales manager, Mr. Davies helped organize Curtiss distributers and dealers covering every state in the Union, and directed the vigorous sales campaign in South America and the Orient.

The Curtiss-New York Aircraft Corporation has been organized to develop the use of aeroplanes in New York State. An intensive survey and analysis of the potential markets of this territory has been made.

Associated with Mr. Davies in the new company are men widely known in aeronautical circles, N. L. Lieberman, secretary and treasurer, was assistant chief engineer of the Curtiss Aeroplane and Motor Corporation during the war and last year served as sales engineer. H. C. Kinne, manager of the Buffalo office, was eastern division manager for the Curtiss company before going with the new organization. Beckwith Havens, one of the early Curtiss exhibition fliers, is acting as district manager in charge of sales promotion work throughout the state.

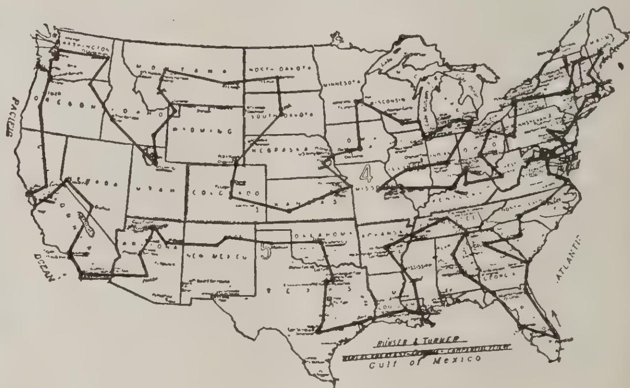
The Farman Type F70, a three passenger commercial plane designed for passenger work over long distances. It is equipped with a 260 H.P. Salmson motor and has a maximum speed of 125 miles per hour, with 5 hours fuel capacity

CIRCUMAVIATING AMERICA IN AN AVRO

CIRCUMAVIATING America in a three seater Avro aeroplane, Lieuts. Runser and Turner, aviation missionaries, are carrying out a most interesting program. They started out to make a trip crossing every state in the union to educate the public that commercial flying is a present, practical achievement. They visit every capital of each state, giving exhibition and passenger-carrying flights. In this way they are preparing the confidence of the public in large commercial lines.

The policy of these aviators is to never stunt a passenger, in that way getting every passenger a booster for the aeroplane. They expect to take a year in completing their flight and average one state a week. With Lieutenants Runser and Turner, is E. M. Freeland, their advance manager. To show the stability of an aeroplane Lieut. Turner, who weighs 190 lbs., walks out on the wings. This proves that the pilot has absolute control and that the aeroplane is a safe and dependable means of transportation.

Lieutenants Runser, Turner and Freeland who are circumaviating America in an Avro. Below is shown the route which they are covering



FABRIC FASTENINGS

By E. D. WALEN and R. T. FISHER

Report 37 of the National Advisory Committee for Aeronautics

THE study of aeronautical fabrics has naturally led to a consideration of the best methods of attaching and fastening together such materials. The following group of experiments does not completely cover this subject but it is believed that the results are of practical value and that they may serve to indicate further lines of research into the stress distribution in built-up fabrics.

Methods of Fastening Wing Fabrics

The supposed failure of the fabrics on the Bristol and De Haviland planes necessitated an investigation of stresses in the fabric during flight. The result proved conclusively that the failures were not what might properly be called fabric failures, but were caused by the lacing cords pulling through the upper fabric and by the failure of the lacing cords due to chafing.

The method of attaching the upper fabric to the wing employed at that time would appear to be very poor engineering. The total load on an area of fabric defined by the distance between lacings and the width of a bay concentrated on a very small area of fabric defined by the bearing surface of the lacing cord. The fabric, considering it to be supported along the rib, has a factor of safety of from 9 to 10. Obviously, the factor of safety at the lacing points is extremely low and conditions of abnormal flight might readily tear the fabric at these places of support. This condition was exaggerated by high vibratory stresses. Test specimens from the wing fabric of the planes that failed showed that the fabric itself had not weakened nor did it show any measurable indications of change in properties.

The Bureau of Standards suggested that a corded tape be put on the surface of the fabric along the rib and that it be so doped that a good bond would exist between the fabric and the tape. The lacings should then be placed over the cord tape at intervals of not more than 4 inches. The wind friction tape should then be placed on. This method of reinforcing has since been tried out in service tests and found to eliminate the trouble.

The structure of the reinforcing tape finally derided upon was:

Weight per linear yard....................ounces..	0.24
Total warp ends....................................	14
Filling threads..	24

Every other filling thread allowed to loop about ⅛ inch from edge warp yarns.

Yarn number, warp..............................	17/3/4
Yarn number, filling..............................	18/2
Tensile strength of warp................pounds..	146

It may readily be observed that the advantages of this tape are:

1. It presents a suitable bearing surface for the lacing cords, preventing them from tearing through due to tension stresses.

2. It has less stretch than the fabric and hence carries practically all of the load along the rib direction and stransmits it to the lacings, thus preserving the factor of safety of the fabric.

The resistance to the cord pulling out when the fabric was placed on the bias and when placed on straight was determined as follows:

The standard grade A cotton and grade A linen as used by the Signal Corps were stretched on frames under constant tension and coated with two coats of an approved acetate dope. Regulation linen lacing cords were placed in the fabric at an angle of approximately 45° to the warp with the two ends projecting from one side with ½ inch on centers of the cords. Two additional coats of dope were then applied.

The same fabrics were prepared similarly with the exception that the material was reinforced by strips of the same fabrics placed on the stretched fabrics before putting in the lacing cords.

The specimens were placed in the jaws of the testing machine and tension necessary to pull the cords through the fabric was noted.

Sample	Not reinforced, cord 45° angle to warp	Reinforced, cord 45° angle to warp	Cord across—		Reinforced, cord across	
			Warp	Filling	Warp	Filling
Standard A cotton	22.1	33.65	23	19	23	28
Standard A linen..	24.5	35.1	21	20	30	26

It will be noted that there is very little difference between the resistance of the fabric to the pulling out of the cords whether they are placed on the bias or not. The warp of these fabrics has practically twice the stretch of the filling, and there is very little difference between the strength of the warp and filling yarns. As a result, it is logical to expect that the warp yarns were carrying very little of the load at the time the filling yarn ruptured when the cord is placed on the bias. Considering this, there can be no object in placing the present fabric on the bias, from the consideration of either the lacings or the fabric between the wings.

Lacing Cords

Experiments were made to determine the strength of lacing cords and whether or not cotton cords could be substituted for the linen cords. Hence, the properties of a lacing cord which are of interest are:

1. Tensile strength.
2. Resistance to abrasion.
3. Resistance to repeated stresses.

An examination of the stresses causing rupture of a lacing cord under flight conditions will lead to the conclusion that a cord fails because it is weakened by rubbing against the rib and because it is subjected to rapid vibratory stresses.

TABLE A

	Tensile strength		Abrasion (fray)		Tension (fray)	
	Unwaxed	Waxed	Unwaxed	Waxed	Unwaxed	Waxed
Linen, 8030, 6-cord	22.0	....	3,000x2	10,000x2	275	860
Linen, 8031, 9-cord	26.3	26.5	4,000x2	8,000x2	590	2,000
Linen, 8031, 9-cord	22.7	22.6	5,500x2	9,000x2	430	1,300
Cotton, 20/3/4/3...	21.2	21.6	9,000x2	10,000x2	1,560	2,950
Cotton, 20/3/3/3...	20.3	19.3	4,000x2	9,000x2	1,100	2,700

Results given in Table A were obtained from tests to determine the relative resistance of the cords to stresses occurring during flight conditions.

Tensile strength.—The tensile strength of the linen and cotton lacing cords are given in the table. Owing to the fact that the quantity of linen cord was very much limited, it was impossible to make as large a number of tests with each cord as was desirable.

The tensile strength was determined by breaking a single strand.

The effect of waxing is practically negligible so far as these tensile strength tests indicate, for no consistent difference in the strength of waxed and unwaxed cords was observable. This, however, is about what we would expect.

The strength of a cord impregnated with paraffin is somewhat less. Ordinary beeswax was used in the tests.

Abrasion (fray).—This fraying test was made by allowing the cord under test to rub upon a spruce wood surface, the line of the thread being perpendicular to the grain of the wood.

A spool of spruce was mounted on an axis (parallel to grain). The cord was fastened at one end and brought over the spool, carrying a 5-pound weight at the other end. The spool oscillates through approximately 90° at 200 revolutions per minute. This means that the string is rubbed 200 times per minute in each direction of its length or 400 rubs in all. The operation was continued in each case until the cord broke. The number of rubs before breaking is recorded in data.

Waxing greatly improves resistance to abrasion in both linen and cotton cords. The waxing effect is greater in the linen than in the cotton cords.

Sources of error.—

Uneven wearing of the spruce surface.

Heat produced, due to friction.

Difference in twist in the linen cords.

Tension (fray).—An apparatus was improvised to apply a force to the cord (longitudinally) at regularly repeated intervals. The force used was approximately 25 pounds and gave the cord a jerk 200 per minute. This causes the fibers to suddenly draw close together, as the load is applied, then to spring apart as the load is removed. The friction thus produced results in a wearing of the individual fibers until finally a break occurs.

If this alternate separation and drawing together is prevented or diminished, as is the case when the cord is waxed, the wearing due to friction is much reduced and the cord does not break so soon. The data gives the total number of jerks before the break occurs.

Here waxing seems to add to the life of the cord, the effect being more marked with the linen than with the cotton cords.

All these experiments and accompanying data serve merely as comparative tests.

SUMMARY.

From these tests it may be concluded that—

1. The unwaxed cotton cords are materially better resistors of abrasion fray than the unwaxed linen.
2. The waxen linen and cotton have practically the same resistance to abrasion fray.
3. The waxed or unwaxed cotton cords are materially better than the waxed or unwaxed linen as a resistor of tension fray.

BOOK REVIEWS

AERONAUTICS. By *Edwin Bidwell Wilson, Ph. D.,* Professor of Mathematical Physics in the Massachusetts Institute of Technology.

This book covers the subject of aeronautics thoroughly and convincingly. It is a highly technical textbook and comes just at the time when most needed as the technical man is destitute for this type of material. Students in aviation will find this to be just the sort of book needed for class and home study.

This volume can be purchased at The Aeronautic Library, Inc., 299 Madison Avenue, New York City. Price $4.25 postpaid.

AIRPLANE PHOTOGRAPHY. By *Herbert E. Ives,* Major, Aviation Section Reserve, formerly Officer in Charge of Experimental Department, Photographic Branch, Air Service.

In the preparation of this treatise, although it is assumed that the reader is familiar with ordinary photography, yet considerable space has been devoted to the fundamentals of photography and scientific methods of study, test and specification, to the end that their bearing on the new problems presented may be clearly grasped. While of necessity the problems and illustrations are drawn from military sources, emphasis is laid on the general scientific principles which apply no matter what may be the purpose of making photographs from the air. Considerable space is devoted to peacetime applications which may be expected to figure prominently in the near future.

The author is well known as a specialist in optics and photography, and to his experience in these fields is added an unequalled first-hand knowledge of the new science acquired in a responsible position in the Air Service.

The price is $4.35 postpaid. Copies can be obtained at The Aeronautic Library, Inc., 299 Madison Avenue, New York City, N. Y.

Composite Index

Readers of the AERIAL AGE will be pleased to learn that it is indexed regularly in the Industrial Arts Index, published by the H. W. Wilson Company.

The Industrial Arts Index now provides subject entries to the contents of considerably more than 100 trade, technical and engineering periodicals. Every article is indexed under as many headings as the contents demand and in each entry is given the full title of the article, the author, name of periodical in which it appeared, volume number, inclusive paging and date. The service is issued in the form of a monthly publication with all entries in one alphabet under subject headings and the numbers are cumulated bi-monthly and quarterly for greater convenience in use. The December number for each year is an annual cumulation and is bound for permanent record.

As a dictionary catalog, the Index has a great advantage over a classified form in that all entries on any one subject can be found in one place. Sub-headings and inverted headings are used freely for greater convenience in finding material on just the phase of a subject desired and for the sake of keeping all material on related subjects as near together as possible. Cross-references are also used freely.

Readers of the AERIAL AGE wishing to examine this Index will find it no doubt in their local public library.

THE INVESTIGATION OF AIRCRAFT RADIATORS AT THE BUREAU OF STANDARDS

By SAMUEL R. PARSONS

Communicated by H. C. Dickinson[2]

ONE of the branches of work undertaken by the Bureau of Standards during the war was the investigation of radiators for aircraft engines. The importance of improvement in radiator design may be seen from the fact that many of the types in use on aeroplanes absorb from 10 to 20 per cent of the power of the engine, because of their head resistance and weight. Many of the features of design that give most rapid dissipation of heat also cause high head resistance, and the problem confronting the designer is one of finding the best adjustment or compromise between these two antagonistic conditions.

Work was begun at the Bureau in May, 1917, at the request of the Power Plants Committee of the National Advisory Committee for Aeronautics. At that time, very little scientific investigation of radiators had been conducted in the United States, though work was in progress both in England and in France, and although the Bureau wrote to a large number of universities, radiator manufacturers, automobile manufacturers, and to the British, French and Italian War Missions, the only information furnished consisted of a report of certain tests made on automobile radiators, and a theoretical discussion of the problem from one manufacturing corporation. A single article was found in a semi-technical magazine. Work previously done on heat transfer and skin friction in long tubes was of some assistance, but not directly applicable to such short tubes as those of a radiator. It was at once apparent that a comprehensive study of the problem must be undertaken, but the emergency of military needs made it necessary to make preliminary tests to determine relative merits of certain types of radiators, before undertaking the more scientific but necessarily slower study and analysis of conditions affecting the performance of the radiator. A certain amount of work was being done at the Washington Navy Yard, and at a conference between officials of the Navy Yard and of the Bureau, general plans were laid out for coordinating the work of the two organizations.

Preliminary Work

For the preliminary tests, a small wind tunnel was constructed with an 8-inch square channel, in which a section of radiator could be placed for test. The core of the test section was also 8 inches square, so that it just filled the channel, while the headers or water boxes were outside of the air stream. Air was drawn through the tunnel at speeds up to 75 miles per hour, hot water was pumped through the radiator, and the rate of transfer of heat from the water to the air was measured. This wind tunnel was entirely enclosed in a steel tank, from which the air could be partially exhausted in order to simulate conditions at altitudes. A 54-inch wind tunnel became available in 1918 for the measurement of head resistance, but before that time the drop in static pressure was measured between two piezometer rings before and behind the radiator in the 8-inch channel. This pressure drop was at first assumed to be equal to the head resistance of the radiator for the same flow of air through the core, but when the large tunnel became available and head resistance could be measured directly, large differences were found between it and the pressure drop, and although later work showed the reason for the discrepancy, the use of the pressure drop was abandoned.

Sections of radiators for test were supplied by various manufacturers, who have co-operated with the Bureau very heartily, and have furnished in all more than a hundred specimens. The preliminary work consisted of tests on a number of these sections, under conditions representing altitudes up to about 24,000 feet, and the results were described in the first of a series of "Aeronautic Power Plants Reports." This first report was written in November, 1917, and has since been superseded by others of the series.

Final Tests

The preliminary tests brought to light a number of points in which the apparatus and methods of procedure could be improved, and work was immediately begun on more accurate and extensive tests, which should furnish data for a more comprehensive analysis of the problems. The 8-inch wind tunnel was rebuilt with a number of refinements, a second 8-inch tunnel (not enclosed) was built for using superheated steam instead of water, and the 54-inch tunnel equipped with an aerodynamical balance was used for measurement of head resistance. The second 8-inch tunnel, which was called the "steam tunnel," being unenclosed, could be operated much more rapidly than the one in the tank, and after tests had shown that steam and hot water were equally satisfactory as sources of heat, most of the calorimetric work was done in the steam tunnel, the other being used mainly for work at reduced pressure. Another important quantity measured in the 54-inch tunnel was the flow of air through the radiator, in terms of the speed of the air stream in which it is placed. This measurement was attended with considerable difficulty, but was finally made by means of a specially designed air Venturi meter attached to the rear face of the radiator. It furnished the connecting link between heat transfer (which was measured in terms of air flow *through* the radiator), and head resistance (which was measured in terms of flying speed). The air flow is one of the very important properties of the radiator, being closely related to both the heat transfer and the head resistance. In addition to the quantities already mentioned, measurements were made of the weight of the radiators, and such geometrical characteristics as amount of cooling surface, dimensions and form of air and water passages, etc.

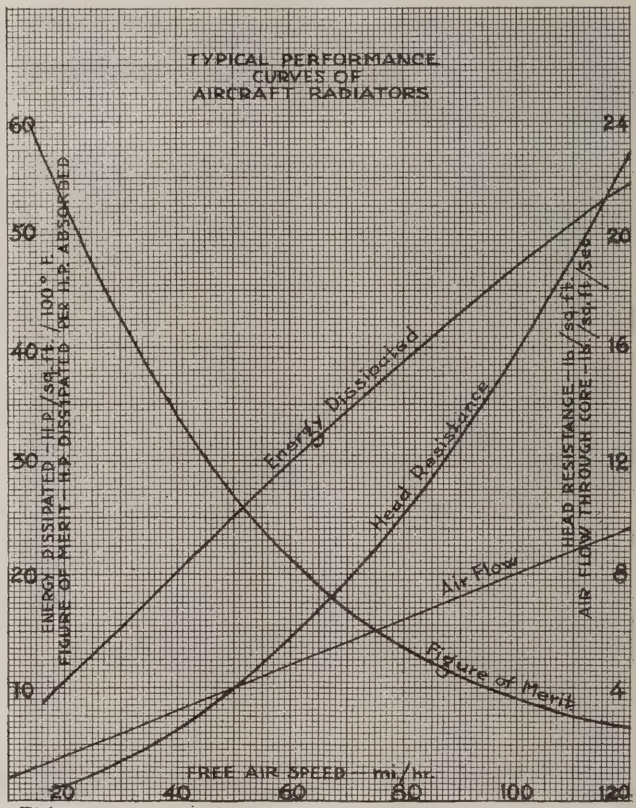


Fig. 1.

The regular tests of heat transfer, head resistance, and air flow were made on nearly sixty types of radiators, and their relative merits were represented by a "figure of merit," which is the ratio of the rate at which heat is dissipated (in units of power) under specified temperature conditions, to the power absorbed in overcoming head resistance and sustaining the weight of the radiator.

Special Investigations

In addition to the tests of radiators just described, special studies were made of a number of factors, of which the following are the most important.

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[1] *Associate physicist, Bureau of Standards.*

[2] *This paper is largely a compilation of experimental results obtained by a number of different observers at the laboratories of the Bureau of Standards.*

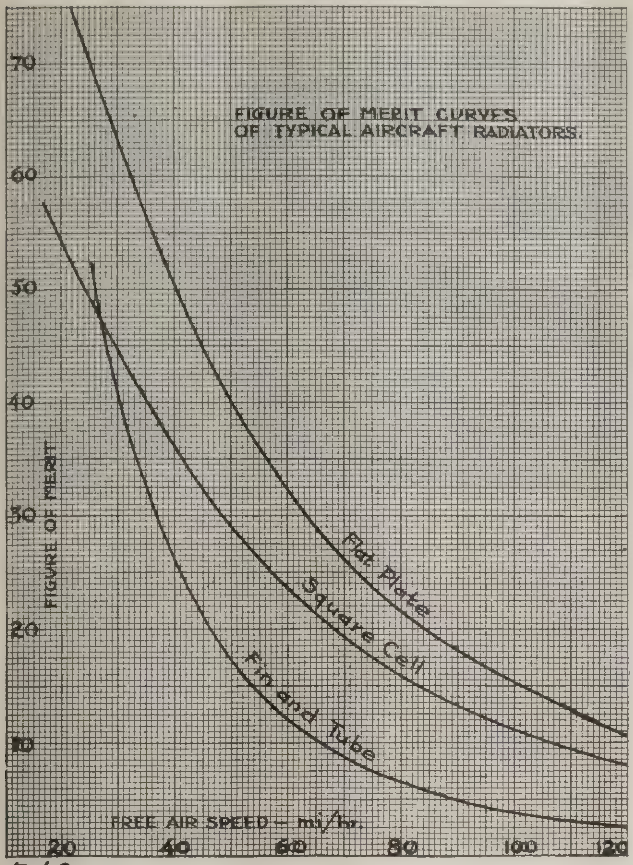

Fig. 2.

1. Effects of the location of the radiator on the aeroplane.
2. Effects of changing atmospheric conditions at altitudes.
3. Effects of rate of flow of water in the radiator.
4. Effects of smoothness and cleanness of cooling surfaces.
5. Characteristics of air flow in the air passages of the radiators.
6. Pressure required to produce desired rates of water flow.
7. Effects of enclosing the radiator in a "streamline" casing.
8. Effects of yawing the mediator, or turning it through an angle from its normal position.
9. Effectiveness of "fins," or cooling surfaces projecting into the air passages, and not backed by flowing water.
10. Empirical equations describing the performance of radiators.

Conclusions Applying to Complete Radiators

Some of the more important conclusions in regard to the performance of the radiator as a whole are the following:

1. "Unobstructed" positions, in which the flow of air through and around the radiator is not restricted by other parts of the structure, allow a higher figure of merit for the radiator than is obtained with "obstructed" positions.

2. For use in unobstructed positions and at high flying speeds, the most efficient type of radiator tested at the Bureau is one whose water tubes are flat hollow plates, continuous from front to rear of the radiator, and with no indirect, or "fin," cooling surface. This type of radiator is characterized by high rate of air flow through the core, high heat transfer for a given flying speed, low head resistance, and high figure of merit at high speeds.

3. For the most efficient cooling, the walls of the air passages should be straight and smooth. Spiral vanes and other devices intended to increase turbulence in the air flow, if they increase the heat transfer at all, do so at the cost of a large increase in head resistance, which, for use of the radiator in an unobstructed position, overbalances any possible gain in heat transfer.

4. Indirect cooling surface (surface not backed by flowing water) should be used with care, but is often advantageous, if proper attention is given to thermal contact between the "fins" that furnish indirect cooling surface, and the water-tube walls from which they receive heat. Indirect cooling surfaces should be soldered to the walls of the water tubes at every practicable point, excepting where the metal that forms them is continuous with that of the wall.

5. Cleanness of the cooling surfaces is very important. Smoothness is also important, but among the kinds of surface usually found in radiators, the differences in smoothness are not great enough to show very much effect on the performance of the radiator.

6. At flying speeds above 75 miles per hour, weight of the radiator is of but small importance in comparison with head resistance.

7. Radiators of the "fin and tube" types, and certain special types that produce a whistling sound in an air stream, are characterized by low air flow through the core, low heat transfer for a given flying speed, high head resistance, and low figure of merit. They are unsuitable for general aeronautic use.

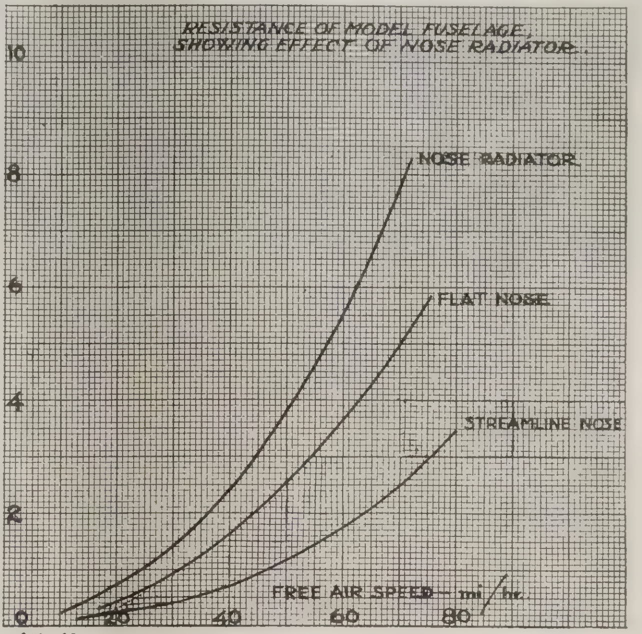

Fig. 3.

Conclusions Applying to Specific Properties

Some of the more important conclusions in regard to conditions affecting specific properties of the radiator, are the following:

1. *Heat transfer* (1) is proportional to temperature difference between air and water; (2) for a given *mass* of air flowing through the radiator, is practically independent of air density; (3) is roughly proportional to the first power of the air flow for cores having all cooling surfaces backed by flowing water, and to a power less than unity when containing "fins;" (4) is not greatly affected by rate of water flow if the latter is above a certain value for each radiator, which value is usually exceeded in aircraft practice; (5) is greater for polished than for rough surfaces; (6) is greater for clean than for dirty surfaces; (7) from surfaces backed by flowing water, is not appreciably affected by the composition of the metal; (8) from surfaces projecting into the air tubes, is somewhat dependent upon the conductivity of the metal; and (9) may be increased by the addition of spiral vanes or other devices intended to increase the turbulence of the air stream,

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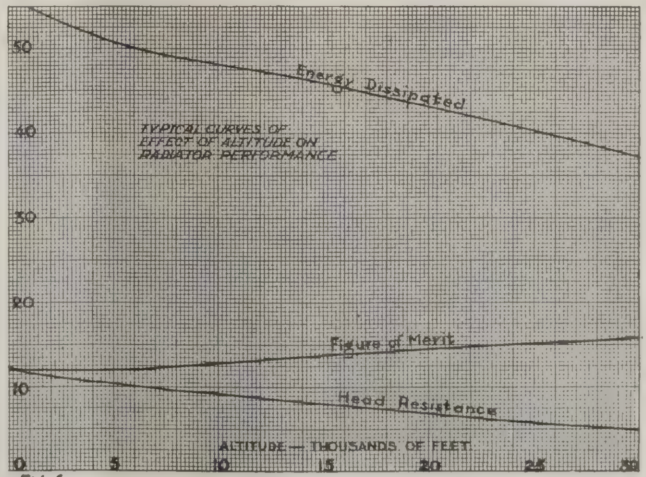
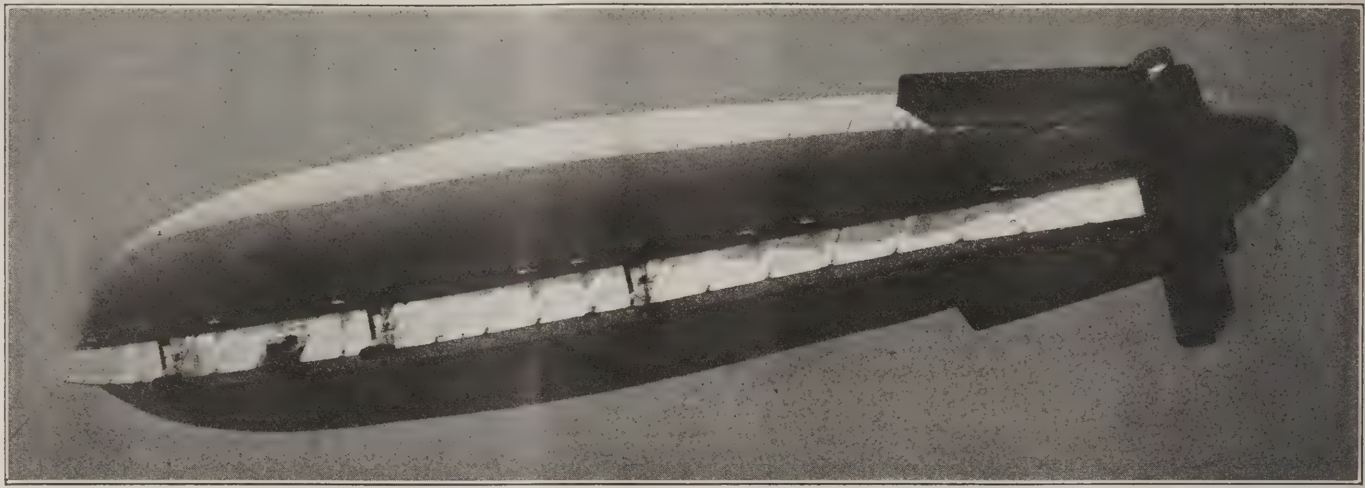


Fig. 4.



THE ITALIAN SEMI-RIGID AIRSHIP ROMA

THE Italian semi-rigid Usuelli Airship derives its name from the rich business man Usuelli who constructed it together with Eng. Prassone, Eng. De Nobile and Colonel Crocco.

The characteristics are:

Volume	cubic feet	1,200,000
Total weight	gross tons	34
Weight of empty ship	gross tons	15
Weight of useful load	gross tons (crew, ballast, fuel)	19
Length	M.	125
Beam	M.	25
Height	M.	27.5

The envelope has 12 divisions for the gas and only six for the air ballonet. A characteristic of this airship is that each of the ballonet divisions has its own air manifold and two controllable exhaust valves.

In the bottom of the envelope and under it there runs, from fore to aft, a rigid triangular girder with the apex down.

This girder has a 12" side and the small parts are made out of steel pipe, having articulated couplings to avoid all stresses of secondary flexion and to assure that they will work as solid of Euler.

The top of the envelope is bi-lunated, much after the fashion of the Astra Torres, but of smaller proportions. Crossing the main beam, there are three longitudinal fabric frameworks in which the strengths are attached to the couplings of the girder by means of parabolic ropes.

The envelope is fixed down to wire rope parabolas deriving from the couplings.

In order to make rigid the nose of the ship in flight, the fore part of the girder is shaped in a large braced cupola.

There are six 12-cylinder 400 H.P. Ansaldo engines placed two by two near the fore, the center, and the after part of the ship. Engines and radiators are situated on cantilevers attached and projecting from the central beam.

The first pair of engines have the axle at an inclination of 12° over the diametrical plan of the ship, the second pair have an inclination of 10° and the third have the axle parallel. This is arranged so that the first engines do not interfere with the working of the second pair, and this with the working of the third.

The propellers have a diameter of 3.50 M. and are directly connected to the engines.

There are 3 fixed rectangular planes and a triplane with elevators.

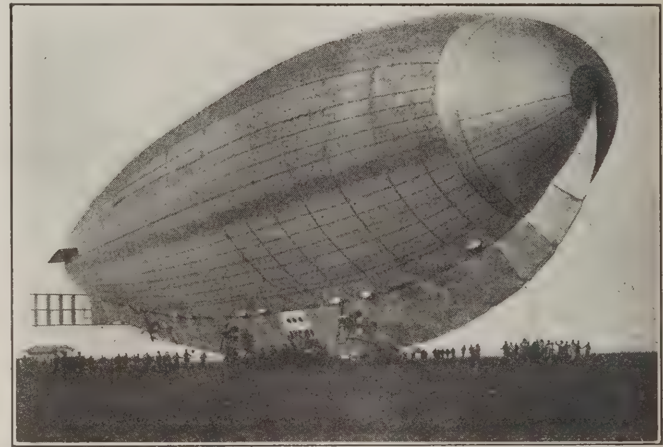
The cabin control is in the girder. For the steering of the ship there exist two control wheels, one fore and one after.

The speed of the ship will be 125 Km. per hour (80 miles per hour).

The fuel oil reservoirs are cylinders of 2'-2" in diameter and 3'-7" in height.

Similar receptacles are also used for the water ballast.

In the girder is provided space for the systemization of an ample salon for the transportation of 25 passengers.



(*Continued from page* 477)

but in every case observed, the disadvantage of the very great increase in head resistance caused by such devices overbalances the advantage of the possible increase in heat transfer.

2. *Mass flow of air* (in units of mass of air flowing per unit time through unit frontal area of radiator) (1) is proportional to the flying speed and to the density of the air, for ordinary cores (whistling types furnish an exception); and (2) is greatly reduced by any device for increasing the turbulence of the air stream. The air flow is turbulent in the air tubes of cellular radiators, even though the tube walls are smooth and straight.

3. *Head Resistance* of a radiator in such a position that the flow of air through and around it is not affected by other parts of the aeroplane (1) varies approximately as the square of the flying speed, except for radiators that whistle in an air stream; (2) bears a close relation to the air flow through the core, i.e., head resistance is high in cores whose air flow is low; (3) varies directly as the air density, for a given flying speed; (4) is considerably increased by projections, indentations, or holes, in the air-tube walls; and (5) for most of the ordinary types, is considerably increased by yawing the radiator, or turning it through an angle from its normal position.

Reports

The results of the various investigations are being incorporated in a series of reports, preprints of which can be obtained from the National Advisory Committee for Aeronautics, Washington, D. C., as they become ready for distribution. A list of the reports submitted to date to the Committee for publication follows. The numbers are those assigned in the printing list of the National Advisory Committee for Aeronautics, and at the time of writing, Nos. 43 to 61 are ready for distribution.

No. 43. Synopsis of Work on Airplane Radiators at the Bureau of Standards, 1917-1918.
No. 59. General Analysis of Airplane Radiator Problems.
No. 60. General Discussion of Test Methods for Radiators.
No. 61. Head Resistance due to Radiators.
    (1) Head Resistance of Radiator Cores.
    (2) Preliminary Report on Resistance due to Nose Radiator.
    (3) The Effect of a Streamline Casing for a Free Air Radiator.
No. 62. Effects of Altitude on Radiator Performance.
No. 63. Results of Tests on Radiators for Aircraft Engines.
    (1) Heat Dissipation and other Properties of Radiators.
    (2) Water Flow through Radiators.
No. 84. Pressure Drop in the Air Tubes of a Radiator.
No. 85. Effects of Nature of Cooling Surface on Radiator Performance.
No. 86. Properties of Special Types of Radiators.
    (1) Flat Plate Radiators.
    (2) Fin and Tube Radiators.
    (3) Whistling Radiators.
    (4) Effects of Yawing Airplane Radiators.

NAVAL and MILITARY AERONAUTICS

Naval Reserve Flying Corps Training

Admiral R. E. Coontz, U.S.N., Chief of Naval Operations, has approved a plan of the Bureau of Navigation which will allow qualified aviators of the Naval Reserve Flying Corps to indulge in flying for two weeks during the coming summer. The schedule provided for four stations, which will give sixty aviators practice in heavier-than-air and twenty practice in lighter-than-air craft every two weeks. The training is to be given in the discretion of the commanding officers at the stations located at Rockaway Beach, L. I., Hampton Roads, Va., Pensacola, Fla., and San Diego, Calif., so as not to interfere with the regular operations of these stations. The schedule is for the exercise of qualified fliers only, for no provisions can be made for the training of unqualified members of the Naval Reserve Flying Corps at this time. Each of the stations will accommodate fifteen in heavier-than-air and five in lighter-than-air craft every two weeks. The training will begin July 1, and the officers who apply for active duty for this training will be assigned as follows: First and Third Naval Districts, to Naval Air Station, Rockaway, L. I. Fourth, Fifth and Sixth Naval Districts, to Hampton Roads, Va. Seventh, Eighth, Ninth, Tenth, Eleventh Districts, to Pensacola, Fla. Twelfth and Thirteenth Districts, to San Diego, Calif.

Commandants of naval districts will arrange all the details concerning the training of the Reserve fliers with the commanding officers of the several naval air stations. Periods of less than two weeks' time actually at the air stations for this training will not be considered. Lack of facilities along makes it imperative that training of any enrolled enlisted personnel, student fliers or other officers and men in the Naval Reserve Flying Corps be not undertaken during the coming summer.

Air Service Schools Prove Successful

The present authorized strength of the Army Air Service being about 11,000, the impression has gone forth throughout the Army that owing to the Air Service's greatly reduced personnel the schools and vocational training of the enlisted personnel has been necessarily neglected. This matter was taken up at a conference, composed of what is known as "Recruiting Drive Committee," in the office of the War Department. A representative of each arm, corps and service of the Army was present. Lieut. Col. John D. Carmody, A. S. A., representing the Air Service. The records of the personnel division show the present enlisted strength as follows: 6,044 three-year enlistments and 3,962 one-year enlistments.

The enlisted students in attendance at the various schools are as follows:

Two heavier-than-air flying schools, 188 enlisted men.

Four lighter-than-air flying schools, 25 enlisted men.

One Mechanics' School, 239 enlisted men.

One School of Aerial Photography, 52 enlisted men.

Thirty vocational schools with an attendance of 3,189 enlisted men.

No reports have been received from the Army Balloon Schools at Ross Field, California, or from Lee Hall, Virginia.

The pay for flying cadets is $75.00 per month, including flying pay. There is also an allowance made for subsistence of $1.00 per day and this is turned over to the cadet mess. The length of the prescribed courses is 7 months for heavier-than-air and 10 months for lighter-than-air. The total number of cadets authorized by law is 1,300 divided as follows: 1,000 for heavier-than-air and 300 for lighter-than-air.

Armored Plane for Ground "Straffing"

During the week the new armored triplane designed and built by the Engineering Division of the Air Service has been tested at McCook Field, Dayton, Ohio. The tests proved to be a great success, and the performance greatly admired by all who witnessed the tests.

The armored craft is of the triplane type, equipped with two Liberty Engines. Both engine and fuselage are completely armored. It carries 8 machine guns and a 37 m.m. cannon and performs and handles very good in the air.

Open Langley Memorial Aeronautical Laboratory

An official opening of the Langley Memorial Aeronautical Laboratory and Inspection of Langley Field took place under the auspices of the Director of Air Service and the National Advisory Committee for aeronautics on Friday, June 11, 1920.

Total Number of Officers Commissioned in the Aviation Section Signal Reserve Corps Up to May 7, 1920

Rating	*Col.*	*Lt. Col.*	*Maj.*	*Capt.*	*1st Lt.*	*2nd Lt.*	*Total*
Military Aviators	..	..	1	...	....	....	1
Junior Military Aviators	..	1	7	...	....	....	8
Junior Military Aeronauts	..	1	...	...	....	....	1
Reserve Military Aviators	..	1	21	129	422	3,167	3,740
Aerial Observers	..	..	1	22	55	72	150
Fight Observers	..	..	...	...	....	238	238
Bomb Observers	..	..	...	...	2	18	20
Balloon Observers	..	..	1	4	8	18	31
Observer	..	..	...	...	8	442	450
Bomber	..	..	...	...	1	201	202
Balloon Aerial Observers	..	..	...	...	....	67	67
Balloonist	..	..	1	6	2	4	13
Flyer	..	1	2	...	5	8	16
Maneuvering Officer	..	...	...	...	....	39	39
Non Flyer	6	9	94	329	537	1,269	2,244
Total	6	13	128	490	1,040	5,543	7,220

Scene at the Christening of the first dirigible of the Commercial Airship Syndicate at Kansas City, Mo.

FOREIGN NEWS

Flying Boats for Bermuda

The Supermarine Aviation Works, Ltd., recently put another of their four-seater Channel type flying boats through its tests prior to being sent out to Bermuda for the flying boat service which is being run by the Bermuda and West Atlantic Aviation Co., Ltd.

The machine passed all its tests in a very satisfactory manner on Thursday, April 29th, and has been dismantled and is in process of packing in special crates for shipment.

With this consignment there will be included a number of spare parts for these machines which will enable a continual service to be maintained throughout the season.

Aerial Prizes in France

At the present moment, when aviation in France is passing through a crisis, it is interesting to note that a sum of over a million francs is up to be won this year in aviation competitions as shown in the following list: Grand Prix Michelin, 500,000 fr.; Petit Prix Michelin, 30,000 fr.; Grand Prix de l'Aero Club, 100,000 fr.; Primes de l'Union pour la Securité en Aeroplane, 100,000 fr.; Coupe Gordon-Bennett, 20,000 fr.; Coupe Schneider, 25,000 fr.; Coupe de la Ligue Aeronautique de France, 30,000 fr.; Prix du Grand Ecart de l'Auto, 10,000 fr.; Concours de l'Association Française Aerienne (gliders), 1,000 fr.; Coupe de Securité Blériot, 100,000 fr.; Coupe Deutsch, 20,000 fr.; Challenge Morane, 10,000 fr. Trophies: Coupe Gordon-Bennett, 12,500 fr.; Coupe Deutsch, 10,000 fr.; Coupe Michelin, 10,000 fr.; Coupe Schneider, 25,000 fr. Total, 1,003,500 fr.

At the meeting of the committee of the Aero Club of France on May 4th a telegram from the Aero Club of America was read stating that the latter would offer a sum of 10,000 fr. for the Gordon-Bennett Aviation Cup. As the Aero Club of France has offered a similar sum, the prize that will be handed to the winner will thus be 20,000 fr.

Poland Orders from Italy

Poland, aware of the possibilities of aviation, has placed an order with Italian firms for over 400 aeroplanes, it is stated.

Paris to Warsaw via Prague

Capt. Deullin, Lieut. de Fleurien and a mechanic, on a Potez biplane, left Paris one day last month for Warsaw, and landed at Prague. They stopped at Strasbourg for lunch and their flying time between Paris and Prague worked out to 4 hours 55 minutes. They flew the 800 kilos to Warsaw in 3 hours 30 minutes on the following day.

The Smallest Triplane

The brothers Ricci, engineer-constructors, have just made the tests of their new machine before the Italian military authorities. The machine, which is the smallest in the world, has a span of only 3 metres 50. The tests were entirely satisfactory, and the pilot maneuvered for a quarter of an hour at a height of 500 metres.

On the other hand, Caproni has recently announced that he has completed the plans for a giant 'plane which will carry 500 passengers.

The Avro "Baby" equipped with a 36 H.P. Green motor, photographed during the aerial derby around London, which it won flying against high-powered aeroplanes

Starts Alone from London on Flight to Australia

London.—A sporting effort to fly to Australia alone in a small aeroplane was begun recently by Lieut. Hinkley, a former member of the British Air Force.

The machine has only a 35-horsepower engine, with special petrol tanks to provide enough fuel for from 600 to 750 miles of continuous flight. The lieutenant will make the flight by way of Paris, Rome and Egypt.

Mails by Air in China

An aerial mail between Peking and Tientsin has been inaugurated. A big Handley Page aeroplane brought mails and passengers, including Mr. B. F. Alston, British Minister, to China.

An International Aerodrome in Berlin

From a message received in Paris from Geneva a scheme is on foot for the establishment of a large aircraft factory in Berlin where aeroplanes of all types will be built. It is also stated that an International Aerodrome is being planned, and that the Aeronautics Department of the Empire and the Inter-Allied Commission have signified their assent to the scheme.

Civil Aviation in Belgium

Civilian flying at the Evere Aerodrome has been so successful that similar squadrons are to be established at Antwerp, Liège, Spa, Mons, Ghent and Ostend. Since the flights were organized last November by the S. N. E. T. A. (Syndicat National pour l'Etude des Transports Aériens), until April 14 last, 520 flights have taken place, and 1,223 passengers have been carried. That the aerial method of advertising has caught on is shown by the fact that five million handbills have been distributed. The society has, in addition, taken 250 photographs and ten cinematograph films.

Present Bristol Aeroplane to King of Belgium

News has just come to hand that the King of the Belgians has been presented with a new Bristol Aeroplane fitted with 275 H.P. Rolls-Royce engine, and that His Majesty has been pleased to accept this gift from Messrs. Handley Page.

King Albert, who takes a very keen interest in flying, personally tried this Machine and expressed his satisfaction with the way in which it flew. His Majesty proposes to keep it for his private use.

This machine was recently flown from London to Brussels in 1 hour and 48 minutes.

Handley Page Reaches 13,999 Feet with 3,690 Pound Load

A commercial type of Handley Page aeroplane fitted with two Napier engines recently made a British record when it reached an altitude of 13,999 feet, carrying a useful load of 3,690 pounds. The machine was in the air for 1 hour and 20 hminutes, and was piloted by Capt. G. T. R. Hill.

Germans Grant Prizes for Greater Security

The German Federal Air and Motor Department has granted a sum of 50,000 marks for competitions, of which money 40,000 marks is to be used for a national competition for the improvement of the security of both passengers and crew in aerial traffic. All contrivances to this end must be intended not only for open aeroplanes, but for closed cabins as well, and must have been designed and constructed in Germany. The practical examination begins in January next and will end about March, most of the tests taking place at Berlin-Johannisthal.

Blimps for Canada and South Africa

Although Australia has declined the "Blimps" as not being suitable for the work in hand, some of them are going to Canada. It is understood that the British Government is presenting nine, including two or three Coastals and several "S.S. Zeros," to the Canadian Government for the use of the Canadian Air Board.

Four of the Zeros are also being handed over to the South African Government.

A Blériot Safety Prize

M. Louis Blériot has offered to the Aero Club of France a sum of 100,000 francs for a prize to encourage research with a view to improving the safety of aeroplanes. The aviation committee of the club is now busy drawing up the rules for the competition for the Coupe de Sécurité Blériot.

British Aviators Killed in Egypt

Cairo, Egypt.—Air-Commodore Robert M. Groves, one of the best-known British aviators, and Flying Officer C. O. Bird were killed when the machine in which they were flying crashed at Armaza recently. Groves was temporarily commanding the Royal Aviation Force in the middle east during the absence of Major-General Salmond. Toward the end of the late war he was a deputy chief of the air force staff.

Increase in Lep-Aerial Activities

The number of passengers using the air route to the Continent is steadily increasing, as a glance at the bookings of the Lep-Aerial Travel Bureau in Piccadilly Circus shows. Besides numerous passengers traveling to Paris by the regular daily services, no less than four special Airco machines have been booked to Paris during the last fortnight. Recently a special machine was booked for Brussels, the passengers having urgent business in that city decided to travel by air.

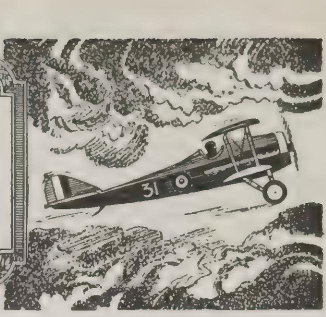
Aerial Advertising in South Africa and India

Handley Page commercial aeroplanes with advertisements painted on their great planes are now a familiar spectacle in South Africa and India. This new form of advertising is likely to become universally popular as commercial flying develops in those countries.

An aeroplane displaying advertisements in huge brightly printed letters can be seen for a considerable distance, and when passing over a town the majority of inhabitants read the announcements.

ELEMENTARY AERONAUTICS
and
MODEL NOTES

By John F. McMahon



The DH4 Flying Scale Model

WHEN building or designing a scale model we generally look over the drawings of well known machines or at least those that stand out from the others for some special reason.

In looking over the drawings we cannot pass up the DH4. This machine was the Battle Eagle of the American Aviation Corps and used for final training on this side, as well.

The DH4 was a familiar sight during the war in the vicinity of any aeroplane field or over cities when anything unusual was going on.

It is a monster for size but as swift as the single seater scouts, its maximum speed being near 140 miles per hour. The big 400 H.P. Liberty motor is entirely enclosed with an aluminum covering which helps to cut down the resistance at high speed and allows this machine to travel so fast although weighing in the neighborhood of 3,750 pounds loaded.

Almost two tons travelling through the air at 140 miles per hour. Just think of the wonderful engineering put into this machine to allow a thing of wood, fabric and light metal to slam the air at this speed and hold together.

Another good point about the DH4 model is its ease of balance. Owing to the long nose the wings are set more to the rear than in other machines which allows the center of gravity to come at a point about one-half inch in front of the pilot's seat.

As in a few previous models, the drawing of this one is not in proportion to the large machine, but the general proportions and shape are retained. It is impossible to scale a big machine down to model size and expect it to fly. One of the reasons is the size of propeller to the spread of wing. The large machine has a span of 42 feet, the propeller is 8½ feet or approximately 1/5 of the span. If we were to do this in a model the span being 35" our propeller would be only 7 inches, which is quite small for a model of this size. We must give it not less than a 10" propeller, and this necessitates making the landing chassis longer to insure the propeller clearing the ground. However, I have proportioned this, and the body in such a way that the model has not lost any of its attractive lines.

Fuselage

The fuselage is built first of ⅛" square spruce. The motor stick which is 14" long is enclosed in the body. It is fastened to the cross struts in such a manner as to have the propeller shaft come through at a point shown by the circle. The motor consists of 14 strands of ⅛" flat rubber. The body should be covered with paper and doped. An imitation radiator should be fastened to the nose of the machine for appearance.

The landing chassis is built of ¼" round rattan for struts and ⅛" brass rod threaded on the ends for an axle. The axle is fastened to the apexes of the "V's" by thread and glue. The wheels 3" in diameter are then put on the ends. The landing chassis is then fastened to the body or strut sockets fastened to the lower longerons and the struts shoved into place. The whole assembly is then cross braced with wire.

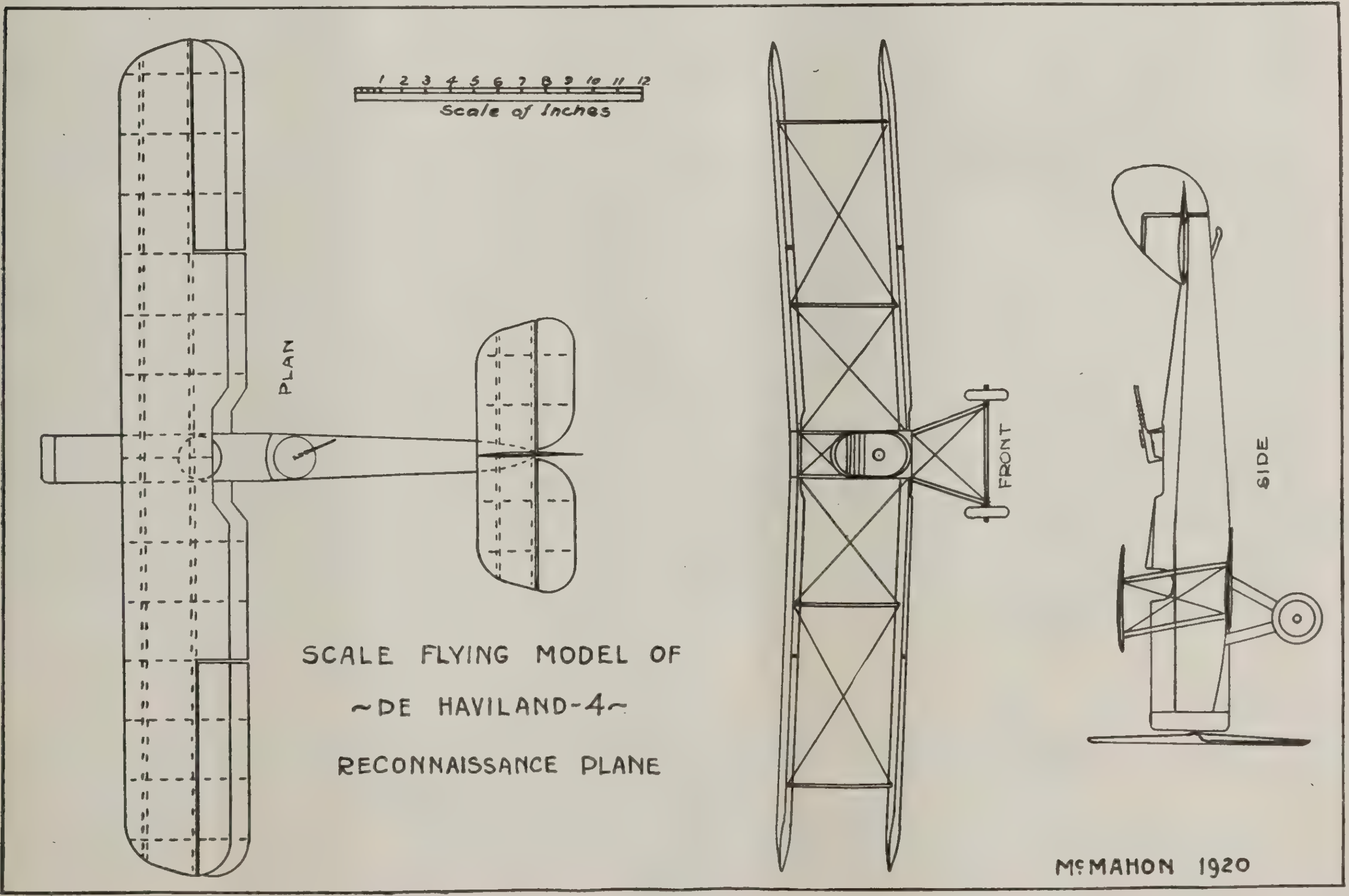
The tail skid is then put on. This is simply a piece of ⅛" reed stuck on with glue.

An imitation machine gun will add to the appearance of the machine and can be made from a piece of 1/16" brass tubing or rod and a handle of wood, mounted on a truss or tripod of brass as shown.

Wings and Tail

The wings are built up of solid ribs and ⅛ inch square spars. The ribs are spaced and glued along the spars at regular intervals of about 2½ inches. The spars are 2" apart. The chord of the wings is 4½ inches, the rear spar is 1¾ inches from trailing edge, the front spar ¾ inch from the entering edge. Ailerons can be eliminated if desired.

The tails works is built up in the same fashion; the spars are ⅛" square and the ribs solid 1/32" thick. The edges of wings and tail as well as rudder are 3/32", rattan or reed. They are then covered with bamboo paper and given 3 coats of dope to shrink the paper and fill the pores.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Height of Camouflage

A Bolsheviki with a haircut and shave.
A Chief Petty Officer with a peacoat.
A Pelham Bay sailor with a service chevron.
A stick of dynamite in a sample case.
A Bolsheviki with a bath tub in his house.
A marine with a hat cord.
M. A. Coolbroth with a smile.
Love letters containing T. N. T. instead of kisses.

—*Naval Air Current.*

Of Course

"There's something nice about this aeroplane fever."

"What is it?"

"You only come down with it once."

"Why Change Your Wife?"

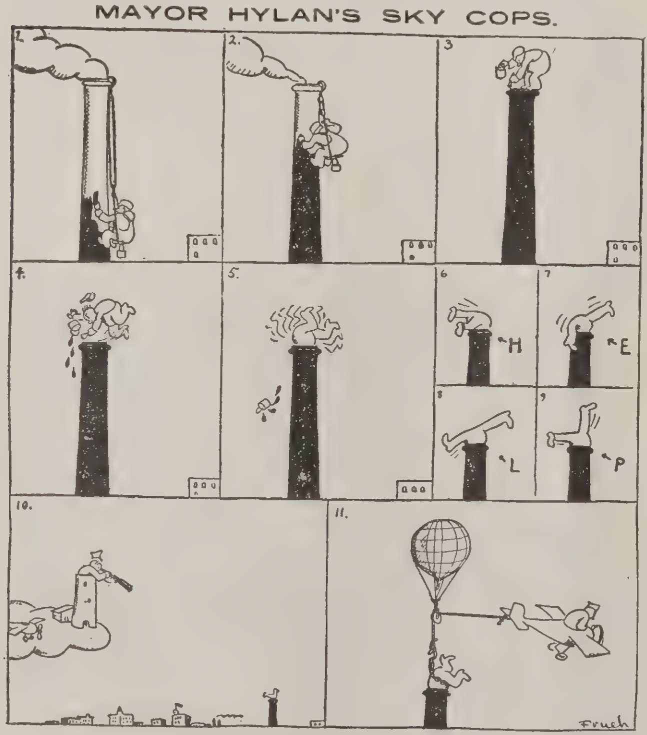
Major Johnston of the Aero Service Corporation of Philadelphia and Atlantic City, tells the following true story.

Last year while one of their planes was in Wilmington, a man came on the field with his wife and a twenty dollar bill. He said to the pilot, "Here's my wife and all I have, take her up."

The pilot conscientiously advised against it, stating that the motor was in bad condition.

The man replied hurriedly, "That's all right, take her up anyway."

MAYOR HYLAN'S SKY COPS.



Courtesy N. Y. World

I'll Say So

Pilot—"Do you really think that bleaching the hair causes insanity?"

Asst. Pilot—"Certainly. I've heard of lots of fellows going crazy over a blonde."

Some Actor

Aviator: "What did she say when you kissed her last night?"

Observer: "She said I should come on Friday hereafter, as that is amateur's night."

A Remedy for a Flood

1st Mechanic: "What's the best thing to do for water on the knee?"

2nd Mechanic: "Wear pumps."

Letters From Privut "Pete"

My dere Mister Editer: Bein' a Cadet and graduating like some of these birds out here this week must be one of the times when, as the famous cartoonist says, a feller gets that "gran' and glorious feeling." Ever since Tuesday I've been trying to conceive how a Cadet felt upon graduation. On that day, last Tuesday I mean, I received the following communication from some fellow who punctuated his remarks with dollar signs. It read:

"O a wonderful thing is a Flying Cadet, he lives on a promise and hope; He entered the service expecting to get what the government said in its dope. The ground school exams were surely a cinch, the questions simple and few; fer instance, state briefly in 10,000 words who flew in 1402? What effect would it have on a Jazzbo machine if the hootin-annie started to leak, and give reason why a student pilot should fly up-side-down for a week?

"Then relieved of the worry of weekly exams and the wonderful ground school affair, he leaves for the field with ambitions galore; of tearing great holes in the air. He arrives on the line chuck full of hope, his face fairly beeming with glee; and is informed by the Sergeant in charge of Cadets to immediately report on K. P. So he washes the dishes and peels the spuds and turns in at night fully clad in his duds; arises at morn at the blast of the horn, still holding his hope in his soul."

But why go further—writes this Cadet. Many of us know his trials and tribulations and that when he has mastered the wonderful course, spending some four months of his time; he receives his diploma, a gorgeous affair, that must cost nearly a dime. And we'll shout with 'em Buddies, "Ain't it a gran' and glorious feeling."

A feeling of satisfaction, we venture. Accomplishment—knowing you have conquered. Let's start the new Cadet class in right. Boost 'em along. "Every man an Aviator."

Yours, "PETE."
(FLY-LEAF)

AERIAL AGE

WEEKLY

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The U. S. S. Maryland, the Navy's Latest Super-Dreadnaught, Photographed From An Army Aeroplane

Stupendous Status of American Aircraft Industry

BLISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
scriptions: Domestic, $4: Foreign, $6. Entered as second-class matter March 25, 1915, at the Post Office at New York under the act of March 3rd, 1879

In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

Aerial Transport Service

which, it is hoped, will eventually serve all of the important cities on the North American Continent.

The plans for this service have been developing for months and will vitally influence Civil, Commercial and Military Aviation throughout the world.

These plans are worthy of the confidence and support of all classes of Citizens, City, County, State and National Officials.

The quality of the personnel is a guarantee that the enterprise will be directed by men qualified by previous experience to manage successfully any undertaking they are identified with.

JONES

AIRPLANE TACHOMETER

"Best by Test"

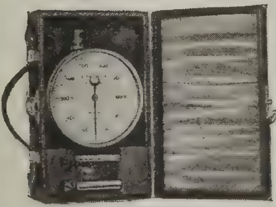
was designed especially for the United States Navy Department for use in the war.

We supplied the Navy Department with large quantities of these instruments and their splendid record of service under all conditions as demonstrated by the famous Trans-Atlantic flight of the NC1, NC3, NC4, where the JONES AIRPLANE TACHOMETERS were standard equipment, has been highly commended by the Navy Department officials.

The mechanism is of the centrifugal type; the dial is black with radium graduations and pointer, and is calibrated in various speed ranges up to 5000 R.P.M.

The JONES AIRPLANE TACHOMETER is the lightest instrument of any type yet produced, and is geared to be driven at cam shaft or engine speed without extra attachment.

JONES HAND TACHOMETER



Carry one and you can note R.P.M. quickly, easily and accurately, wherever you happen to be. Invaluable about power plants, generating stations, turbines, engines, shaftings. A neat little instrument of precision, with uniformly spaced dial, in handsome Morocco carrying case.

Send today for a report of test by the United States Bureau of Standards and our new booklet on tachometers

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29 W. 35th St., NEW YORK
A. J. Fisk, Special Representative
965-7 Woodward Avenue, Detroit, Michigan

AERIAL AGE
WEEKLY

VOL. XI JUNE 21, 1920 NO. 15

TABLE OF CONTENTS

PAGE

Stupendous Status of American Aircraft Industry.... 503

Legal Action Started to Bring to Light Pernicious Misrepresentation of a Vicious Clique Which Has Been Making Trouble In the Aeronautic Movement.... 504

The News of the Week.... 505

The Aircraft Trade Review.... 507

Impressions of an Aerial Tour in America.... 508

The French Competition for Peace-Time Aero Engines.... 509

The Investigation of Aircraft Radiators at the Bureau of Standards... 511

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures.... 514

Naval and Military Aeronautics.... 515

Foreign News.... 516

Elementary Aeronautics and Model Notes.... 517

Aeronitis.... 518

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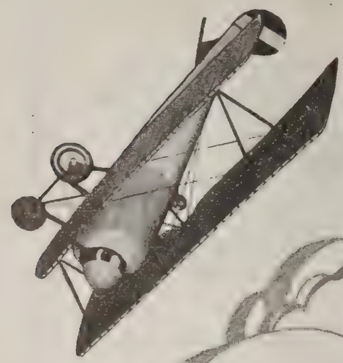

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properly understood and **scientifically used** in flying training saves time, money, and wear and tear on planes, motors and instructors

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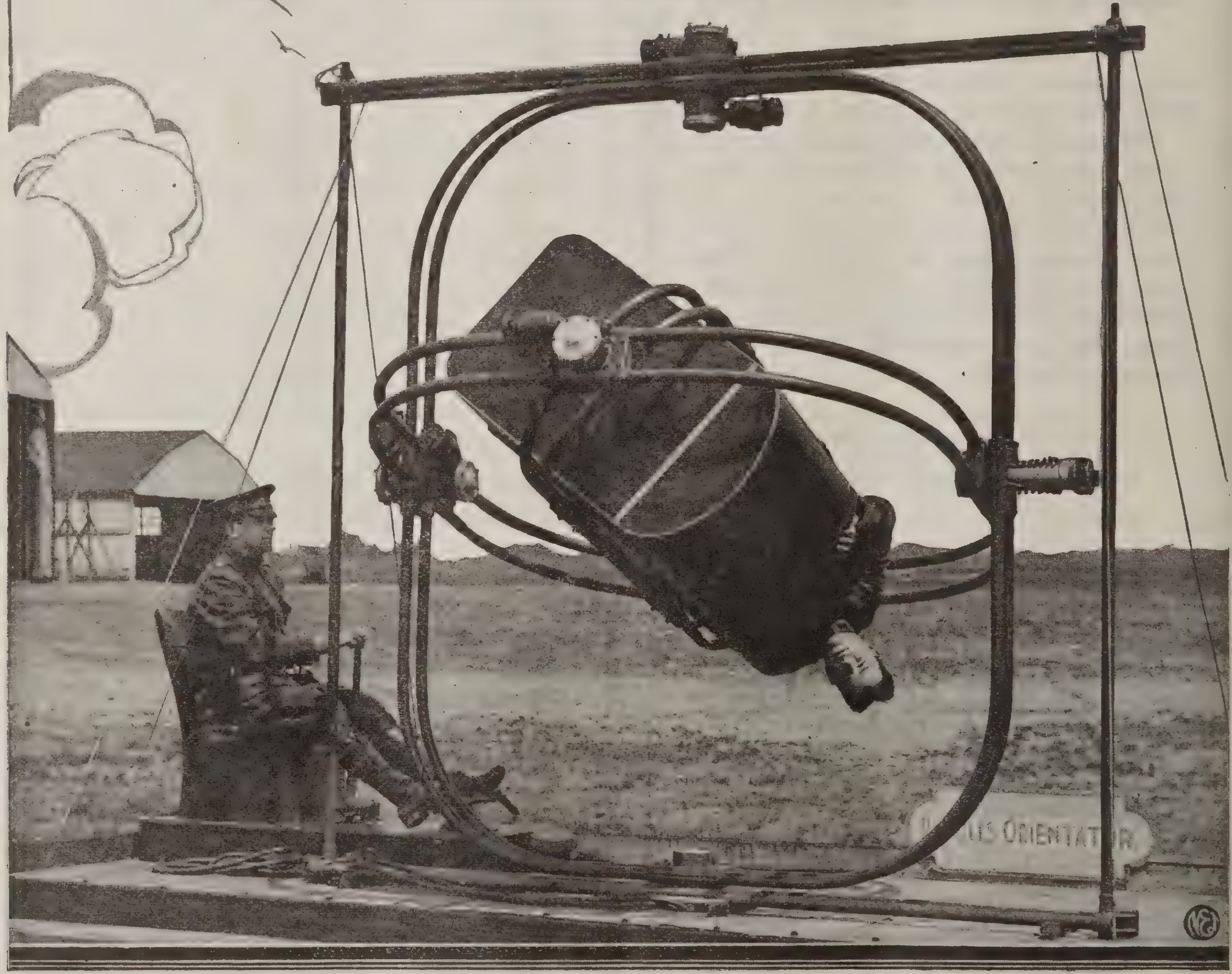
The fullest measure of **enjoyment** is realized by those whose **Fundamental Flying Faculties** are developed to a point of instinctive response to requirements in **all positions**, and who fly without imposing **excessive strains** upon their ships.

This invention **exclusively built, owned, and used by the Government during the war**, is now to become available for use in the civilian field. Some of the most successful and prominent flying instructors in America are becoming identified with this enterprise.

Personnel announced in succeeding issues



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VOL. XI NEW YORK, JUNE 21, 1920 No. 15

STUPENDOUS STATUS OF AMERICAN AIRCRAFT INDUSTRY

IN a new movement like aeronautics it is usual for people who are planning or taking up aerial activities to write to or call on the editors of the leading aeronautic publications to ask their opinion or advice and enlist their coöperation and moral support or just to get information. Almost invariably the editors are sworn to secrecy. Nothing is to be printed until a formal announcement is made!

Today, as the editors of AERIAL AGE were exchanging notes regarding aerial activities which they had been asked to keep secret they found that the activities under way, which they still are bound to keep secret, are so extensive, and the business to be derived therefrom by the aeronautic industry is so large, that even the demand created for aircraft by the three extensive aerial transportation lines announced at the Third Pan-American Aeronautic Congress is to be surpassed.

Fifteen Thousand Aeroplanes Needed This Year

True we still hear the wailing of the same paid and professional mourners who a year ago cried that aviation was dead and there would not be demand for one hundred aeroplanes during the year. A year ago they pronounced the editors of AERIAL AGE crazy when we stated that over one thousand aeroplanes would be sold for civilian purposes within twelve months if deliveries could be made. As a matter of fact we knew of that many aviators who wanted to buy aeroplanes—and finally over two thousand aeroplanes were sold in eight months and the reason more were not sold was that manufacturers could not make deliveries.

This year, if the obstructionists step out of the way and stop their artificial, pessimistic mourning, this country will absorb from ten to fifteen thousand aeroplanes and a demand will be created for a least as many new and latest aeroplanes to be delivered next year.

How the Curtiss Company's Great Success is Misrepresented As a Failure

During the past week the Manufacturers' Aircraft Association issued a statement for publication the first paragraph of which reads as follows: "The Curtiss Aeroplane & Motor Corporation, which represents three-fourths of the entire American aircraft industry, and which was one of the largest individual producers of aircraft in the world, today announced practically complete abandonment of all plans for the manufacture of commercial aeroplanes in this country.

"This step is taken as the direct result of the failure of Congress to protect the aeroplane market of the United States against the invasion of British aeroplanes, bought by a syndicate from the British government at one per cent of their cost, for export to this country and now about to be dumped into this market."

Further the statement tells of several Curtiss plants that have been closed during the past year and asserts that the Churchill Street plant in Buffalo will be closed by July 1st.

This statement, like several other statements issued by the Manufacturers' Aircraft Association (mentioned in AERIAL AGE for February 9th and 16th) is misleading and conflicts with the statements issued by the Curtiss Company during the past six months in which large orders for aeroplanes were announced.

High Official Told Aerial Age of $10,000,000 Orders for Civilian Aircraft Three Months Ago

Three months ago a high Curtiss official told us of civilian orders for aeroplanes amounting to $10,000,000—and more were expected. The Curtiss Company was far back in deliveries and could not promise deliveries of certain types for many months.

True, the ten million dollar business was not sufficient to keep busy all the Curtiss factories enumerated in the Manufacturers' Aircraft Association's statement. But this was not to be expected, because these factories were built for war production and it would take orders amounting to $100,000,000 a year to keep them running at full capacity. This was understood and all but two of the Curtiss factories had been closed about a year ago. Therefore, the M.A.A.'s statement was doubly misleading.

True again, the $10,000,000 civilian business did not appear very large to some Curtiss officials when they compared it with the war business. which amounted to close to $90,000,000.

But no fair minded person expects a war business to continue on a war basis after the signing of the Armistice any more than it is expected that the Government should spend fifteen billion dollars a year on war supplies now that the war is over. The Aircraft Program, as meager as it was, had cost the United States $2,000,000,000, and the American people will have to pay $80,000,000 a year in taxes for that expenditure.

The Curtiss Company officials realized that they could not expect to continue to get Government orders amounting to $100,000,000 a year and could not hope to get fifty million dollars in civilian business unless they undertook to establish aerial transportation lines, like the Handley Page Company did throughout the world, which the Curtiss Company was not willing to do. Therefore they arranged to revert the Curtiss Company to a peace basis. As the controlling interests in the Curtiss Company were automobile manufacturers and people interested in other manufacturing enterprises and are in need of additional manufacturing facilities, it was only natural that they should consider utilizing the surplus Curtiss manufacturing facilities for other purposes.

That there is extensive civilian business to be had is admitted even by those employees of the Manufacturers' Aircraft Association and other obstructionists who have been opposing the development of civilian aeronautic activities since the signing of the Armistice, and employed paid "mourners" to circulate reports to the effect that aeronautics would "die" unless the Government subsidized those "poor" manufacturers who had already made millions of dollars in profits during the war.

Obstructionists Argued Themselves Out of Business

As a matter of fact, while they were trying to hold up the Government for subsidies and were creating Congressional antagonism to aircraft appropriations by their "pernicious lobbying," a number of progressive firms secured substantial business and other new firms got a good start. The few retrogressive members of the Manufacturers' Aircraft Association who, with the Association's employees, spent their time in scheming, were so busy arguing against cilivian aeronautics that they overlooked the fact that they were arguing themselves out of substantial, ready business.

When the announcement was made that the Southwest Airplane Co. had placed orders with the Curtiss Aeroplane & Motor Corporation for 447 aeroplanes, representing a total of $2,500,000, these obstructionists tried hard to cast a doubt on the announcement, and they went to extremes to do so. Now they admit that it was true.

Manufacturers all over the United States have found out that these few individuals who have been using the Manufacturers' Aircraft Association's name in their scheming have hurt American aviation by delaying its development since the signing of the Armistice by their mis-statements, scheming and "pernicious lobbying," which caused Congress to refuse further appropriations; and those responsible have become very unpopular notwithstanding their "subscriptions" and "entertainments," and have brought another "Congressional condemnation on the Manufacturers' Aircraft Association and on its half dozen active members by their ill-advised scheming which was referred to in Aerial Age for February 9th and 16th.

We will deal with other important aspects of this situation in future numbers of Aerial Age.

LEGAL ACTION STARTED TO BRING TO LIGHT PERNICIOUS MISREPRESENTATION OF A VICIOUS CLIQUE WHICH HAS BEEN MAKING TROUBLE IN THE AERONAUTIC MOVEMENT

Steps Taken Simultaneously With Attorney General's Action Are Intended to Establish New Moral Force in Aeronautics

AERIAL AGE this week is forced once more by compelling duty to deviate from its usual policy of not printing anything about alleged shortcomings of organizations and individuals. Aerial Age since its inception has been conducting a national campaign of education for the upbuilding of aeronautics, and especially for the healthy growth of the aeronautic industry. In the discharge of its duties as the national technical, engineering and trade authority in the aeronautic field, Aerial Age has often seen evidence of attempts on the part of a few vicious individuals to make trouble for the entire aeronautic movement.

Looking at the situation as a whole, at the greatness and healthy development of the fast progressing aeronautic industry, we usually found that the relation of this apparent trouble to the industry was only the relation of a sore on a healthy body.

During the past two years, however, this sore often grew in size and threatened to poison the entire aeronautic industry and Aerial Age had to point out the danger.

Evidence has now come to light showing that this vicious clique was violating some of the most basic unwritten and written laws which govern the affairs of men.

Following our estabished policy Aerial Age has always hesitated to believe any wrongdoing on the part of anybody.

Our desks, like the desks of editors and newspapers and Congressmen, have been flooded in the past two years with communications from organizations and individuals making known their own achievements, plans and aims; and also of communications which people and organizations write to make known alleged shortcomings and failures of other organizations and individuals.

Generally speaking, neither congressmen nor editors are influenced by such communications and only pay notice when there is clear evidence that an issue is involved which affects one or more phases of national welfare. Congressmen are forced daily by lack of time, and editors by lack of space, to eliminate, first, the less important things for more important things; second, the destructive for the constructive; third, the things of temporary value for the things of permanent value.

When dealing with the actions of individuals and organizations, the prevailing policy is usually to give the benefit of the doubt to everybody, but to let those who accuse others prove that they have done as much for general welfare or progress as those whom they accuse, unless there is clear evidence that the written or unwritten laws which govern the affairs of men have been violated by the accused.

Mistakes and actions due to what is generally implied as "bad judgment" are usually excused, and press agent "boastings" are received with more than passing interest, the general tendency being to want to know what men and organizations think of themselves and how they estimate the value of their work and how far-reaching their plans and aims are.

During the past year a few individuals, only half dozen in number, have indulged in a most malicious conspiracy to wreck the aeronautic movement so as to get control of it.

The motives behind this conspiracy are selfish, as will be shown in the near future. To bring out the motives and solve this harassing problem the publisher of Aerial Age has requested the District Attorney of New York to arrange for his appearance before a Grand Jury. Mr. Henry Woodhouse had occasion during the past two years to bring to the attention of the District Attorney's Office, evidence that some individuals were trying to discredit him because they were afraid that Mr. Woodhouse would make public certain facts regarding their connection with the so-called "billion dollar aircraft scandal," which he had learned while making reports on the aircraft situation for Secretary Baker and President Wilson and the United States Senate in 1917 and 1918.

In requesting the District Attorney to arrange for his appearance before a Grand Jury, Mr. Woodhouse states that as soon as it became known that he had been requested to make reports regarding the so-called aircraft scandals for President Wilson, Secretary Baker and the Senate Investigating Committee, a few individuals, not prominently connected with the aircraft program, had attempted to discredit him in various ways for the obvious reason that they seemed to be afraid that Mr. Woodhouse would include in his reports facts regarding their alleged irregularities, which Mr. Woodhouse was understood to have learned while making his investigations.

Mr. Woodhouse's reports to President Wilson and Secretary Baker became known to the United States Senate and on July 11th, 1918, the Senate Investigating Committee asked Mr. Woodhouse for copies, which were printed as Senate documents in August, 1918, the reports covering 58 closely printed pages. In these reports Mr. Woodhouse did not deal with personalities or alleged irregularities of individuals and the reports were stated to have been the most thorough and impartial reports of the aircraft situation ever presented to the Government officials. Even Mr. Howard E. Coffin who, as Chairman of the Aircraft Board, was under fire, expressed his appreciation of Mr. Woodhouse's strict fairness and of the broadness of purpose and exhaustive scope of his reports.

The efforts of some individuals to discredit Mr. Woodhouse, which began at the time when he was asked to make these reports, continued during the past two years and have been especially violent in the past two months, since Congress requested the Attorney General on April 12th, 1920, to "institute investigations before Grand Juries for the purpose of indicting and prosecuting such persons as are guilty of criminal conduct, and to institute civil suits for the recovery of any Government funds which have been fraudulently or illegally paid on account of such emergency construction work."

The discussion which took place on the floor of Congress on April 12th, contained many references to the alleged aircraft scandal, one of which was a statement by Congressman Fess, printed in the Congressional Record for April 12th, which referred to the aircraft scandals and which Mr. Woodhouse printed in Aerial Age Weekly for April 26th, 1920.

Following the publication of the Congressional Reports of the Senate and House of Representatives Investigations of the so-called "billion dollar aircraft scandal" in Mr. Woodhouse's publications, Mr. Woodhouse was subjected to a number of covert attacks all based on misrepresentations, which culminated in a printed attack in the New York *Evening Post*, recently, which caused Mr. Woodhouse to start action against the *Evening Post* for $250,000.00 damages through his attorneys Messrs. Beekman, Menken & Griscom, in the Supreme Court of New York County.

During the war Mr. Woodhouse felt that he should give all his time to the cause of aerial preparedness, the building of our Air Forces for winning the war. Last year he felt that he should concentrate his efforts in the work of solving the problems of reconstruction which were so imperative and vital to the country. Now he feels that he cannot do a greater service to the public than to present to a Grand Jury all the facts regarding the attempts made to create trouble in the aeronautic movement by individuals who also attempted to discredit him and prevent Aerial Age doing its public duty during the war and from printing the official reports of the Aircraft Investigations made by the House of Representatives and the United State Senate.

THE NEWS OF THE WEEK

Metal Plane Flies 248 Miles in 145 Min.

A thrilling race between two all-metal monoplanes from Washington to Central Park, L. I., last week was won by the plane which carried Colonel W. K. Wilson, of the General Staff of the United States Army, defeating Colonel W. E. Gilmore, chief of the supply group, United States Air Service. The winner covered the 248 miles in 145 minutes, six minutes ahead of the second machine.

The aeroplanes were the new Larsen monoplanes, built entirely of metal, with internally braced wings. With Colonel Wilson were five army officers and one woman in the inclosed cabin of his machine, and Colonel Gilmore had five officers as passengers.

Colonel Wilson wrote three letters on his way up. "The writing is legible and firmer than if I had done it on a Pullman car," he said.

Major Glidden Returns to U. S.

Major Charles J. Glidden, who has been on a trip around the world in connection with the globe-encircling aerial derby which the Aero Club of America is organizing, has returned to this country. He covered nearly 40,000 miles and reports a world-wide interest in the race. He stated that Siam is leading most of the countries of the world in aeronautical development, and aviation is dominating the interest of the people, while governmental and private agencies are backing aeronautical enterprises on a large scale.

Leaps 19,800 Feet with Parachute

San Antonio, Texas.—Dropping from an aeroplane at an altitude of 19,800 feet and drifting ten miles before he came to earth, Second Lieutenant John H. Wilson of the Army Air Service branch at Kellyfield recently broke the world's record for altitude in a parachute jump.

The world's record for a parachute jump from an aeroplane was 14,000 feet and was held by a French aviator. The former American record, 8,000 feet, was made by Sergeant Bottriell, of the Air Service at McCook Field, Dayton, Ohio.

Aero Service from N. Y. to Boston

The Aero Limited has inaugurated its passenger carrying service for the summer season, and will operate fifteen six-passenger flying boats between New York and Boston, New York and Albany, New York and Atlantic City, as well as an aerial sightseeing service around New York City.

The New York to Boston service will be a non-stop flight from 86th Street and the Hudson River to Commonwealth Pier, Boston, a distance of 230 miles, via Newport and the Cape Cod Canal. Harry Rogers, the pilot who brought one of the Aero Limited's flying boats from Miami, Fla., a few weeks ago in record time, has been chosen to conduct this route.

Among the passengers of the first flight to Boston from New York were, Helen McLean, travelling saleswoman for the Francis Leggett Company. The Aero Company plans tri-weekly flights to Boston, touching at Long Island Sound and New England coast resorts en route, and there will be passenger flights between New York and Albany, with stops at Poughkeepsie and Newburgh.

Prepare for Night Flying in Spokane

Spokane, Wash.—The Parkwater municipal aviation field is to be electrically lighted to enable flyers to land safely at night. Announcement of the coming improvement was made by C. H. Messer, head of the United States Aircraft corporation. The company holds a lease on the field. The generating equipment, with its heavy Edison storage batteries, is already at the field and installation work will be begun at once.

Plan Aerial Routes Between Hawaii and California

Aerial passenger and express liners, carrying twenty passengers and 2,000 pounds of mail or express matter, flying from Honolulu to San Francisco in thirty-six hours, is the type of service which may be inaugurated between Hawaii and the mainland in the fall of 1921, if capacity traffic can be guaranteed locally for the air liners.

J. M. Servantie, veteran of the French aviation service, who was in Honolulu about a year ago, when he urged establishment of an inter-island air service, has made the suggestion. He is now managing director of the United States Aerial Express Company, which is operating six planes between Detroit, Toronto, Buffalo, Cleveland, Chicago and Toledo, with eighteen more liners soon to be placed in the same service. With this enterprise successfully established, Servantie has again turned his attention to Hawaii and proposes to organize a corporation to operate inter-island and Hawaii-San Francisco services.

Lt. Col. Barker Flies to Rotary Conference

Toronto, Canada.—Lieut. Col. W. G. Barker, V. C., D. S. O., and H. G. Stanton recently traveled to the Buffalo Conference of Rotarians via aeroplane. The flying time to Buffalo was 55 minutes and the mileage about 75 miles. The route taken was around the end of Lake Ontario via Hamilton.

Shaw Flyers at Danbury, Conn.

Flying at an average speed of about ninety miles an hour, Lieutenant George W. Shaw and Lieutenant G. L. Bradford, of the Shaw Flyers, made a journey from Port Richmond, Staten Island, to Danbury, Conn., in fifty-five minutes, and landed on the Tucker aviation field there.

The Shaw Flyers gave exhibition and passenger-carrying flights, many persons taking the advantage of the aeroplane being there and going up.

Flies From St. Petersburg, Fla., to Springfield, Mass., in F-Boat

A Curtiss F type flying boat recently completed a long distance flight from St. Petersburg, Florida, to Springfield, Mass. Lieut. Bert Shields piloted the plane or Flying Fish as it is called, and made the entire trip alone. The machine had an OXX-6 engine, and covered the distance, 1,986 miles in 25 hours and 30 minutes, flying time.

The flying-boat is owned by J. H. Allen, who intends to spend the summer at Springfield and vicinity carrying passengers. J. B. La Mont, the mechanic, who has been in the aviation work for twelve years, is responsible for the condition of the engine and plane, which permitted the excellent performance.

Reaches 27,000 Feet in DH 4B

Recently all altitude records for the Aviation Repair Depot at Dallas ,Texas, as well as the Southern Department were

K C K OPTIMIST CLUB
Adfilm Company

The Optimist Club of Kansas City, hold an enthusiastic meeting in the hangar of the Commercial Airship Syndicate broken when Major Douglas B. Netherwood, Commanding Officer of the Depot piloting a DH-4B reached an altitude of 27,400 feet. He was accompanied by A. L. Everetts, assistant foreman of the engine test department.

Major Netherwood reached the maximum of his climb in 72 minutes, remained there two minutes and decided to return to lower levels when his plane refused to climb higher. In all, he was in the air 121 minutes.

The plane used was rebuilt at the Depot from a DH-4 and differs in no way from the standard product. Standard equipment and adjustments prevail throughout.

The Liberty engine used in this plane is slightly faster than the average making 1900 revolutions per minute in horizontal flight. The climb to this altitude was made in a standard plane without the use of a supercharging oxygen device.

Flies to Langley Memorial

Dr. J. G. Coffin, director of research for the Curtiss Aeroplane and Motor Corporation, flew from Roosevelt Field recently to Hampton, Va., to attend the dedication of Langley Memorial Laboratory and Field. He flew in a Curtiss Oriole piloted by Paul Collins.

Girl Takes Mother for Flight

Miss Neta Snook, an aviatrix, of Ames, Iowa, recently took her mother, Mrs. W. F. Snook, for a flight over their home town. Mrs. Snook was exceedingly pleased with her aerial trip, and it is believed to be the first time a girl flyer took her mother for a flight.

Pacific Coast Airline Starts

San Francisco.—The aeroplane Avion arrived in San Francisco recently in seven hours from Los Angeles, in what was announced as the first trip of a regular passenger aeroplane service between the two cities. It carried six passengers and two pilots. At Bakersfield and Fresno the passengers disembarked for lunch.

Aeroplanes for Adirondack Resorts

Aviation is to play an important part in the "get-together" movement which is the principal feature of the season of 1920 in the Adirondack Mountains. Aeroplanes will make trips across the ranges and over the lakes from one resort center to another, and in anticipation of this flying fields have been established at some of the leading resorts.

The Champlain Valley will be covered from Plattsburg south to Westport, where a new aviation field has been laid out, south of the links of the Westport Golf Club, under the direction of Harry P. Smith, who is an enthusiast over flying. Southwesterly there is a short flight to Schroon Lake, another of the resort centers. It is eight miles in an air line from the Westport field to Elizabethtown, where the links of the Cobble Hill Golf Club will be utilized for a landing place.

Plane Modeled After the NC-4

Anxious to be the first man to fly across the Pacific ocean, Lieutenant Charles Edward K. Smith of Oakland, Cal., is making preparations to attempt the flight.

Entered in the England to Australia race, Lieutenant Smith was forced out of that event because of inability to obtain engine parts for the machine he intended flying.

Several interests have made a combination offer as a prize for the flight across the Pacific. With their assurances, Smith is laying his plans for the winging of the ocean.

Although nothing definite has been decided, the local aviator probably will use a seaplane similar to the NC-4, which made the trans-Atlantic flight. Smith has hopes of joining Sir Arthur Brown, navigator for Captain Alcock, who made the first non-stop flight across the Atlantic in a Vickers.

An Outlook Windshield Cleaner on a Dayton Wright aerial coupe. An aviator whose aeroplane is equipped with an Outlook Windshield Cleaner, is prepared for rain, hail or snow

Akron Flying Club Holds Aerial Meet

The Akron Flying Club, of Akron, Ohio, recently held an aerial meet at which no spectacular nor hazardous flying was permitted. Under the personal direction of John R. Gammeter, one of the pioneer aviators of the country, president of the Ohio Association of Aero Clubs and honorary life member of the Akron Flying Club, this organization staged an aerial field day to celebrate the opening of its official flying field. This field had been donated a short time before by W. E. Wright, a man deeply interested in the commercial future of the aeroplane.

Rules governing the actions of the pilots both while on the ground and in the air were strictly enforced.

According to the estimates of the club over 15,000 people attended this meet.

The program was divided into three sections. The first section was devoted to formation flying. During the formation the pilots were not allowed to get closer together than the committee on safety had deemed safe. The second section consisted of aerial manoeuvres, which were done above an altitude of 2,500 feet. The third section was a demonstration of the "spin." This was added to the program merely to show that a spin itself is not dangerous as long as sufficient altitude was obtained before it was attempted.

During the time the various numbers on the program were being carried out the seven pilots at the meet carried passengers at a nominal fee. Over 200 passengers tool their initial "flights" during the day.

The great success of the meet has stimulated the idea of a bigger meet later on in the summer and plans are now under way by club officials to stage this second demonstration.

N. Y. Times by Aeroplane in Chicago on Day of Issue

Copies of the third edition of June 9 morning's New York *Times,* containing all convention developments up to 3 o'clock that morning, New York time, reached Chicago to the surprise and delight of many delegates and convention visitors, who never before have had New York news until the day following.

The papers reached the flying field by aerial mail at 4:35 in the afternoon, and should have been in the hands of readers before they sat down to their dinner had it not been for two misfortunes which befell the truck bringing them to the General Post Office.

The papers reached the convention centres at 10 o'colck in the evening. A number were delivered to the leading candidates and others, who were glad to get them. and at once interrupted conferences and other things occupying their attention long enough to look over the convention stories and other late news.

The big De Haviland aeroplanes carrying copies of the third edition of the New York *Times* left Heller Field, in the Forest Hill section of Newark, N. J., at 6:30 A. M.

The first stop made by the aeroplane was at Bellefont, Pa., where Pilot R. Page turned the bags of newspapers over to another aeroplane, which within two minutes was speeding on the second leg of the flight to Chicago.

The next stop was at Cleveland, Ohio, whence a third aviator took the copies on to Chicago. Altogether the time of flight between New York and Chicago was a little short of twelve hours.

The AIRCRAFT TRADE REVIEW

China Offers American Market

In a communication recently received by the Merchants' Association of New York from W. A. Chapman, secretary of the American Chamber of Commerce of China, Shanghai, it has been pointed out that the Chinese Government is contemplating the establishment of an aerial mail service between Peking, Hankow and Shanghai. It is estimated that 100 aeroplanes would be required for this service, and British, French and Italian manufacturers' representatives are already on the ground endeavoring to secure this business.

Mr. Chapman points out that there is an excellent opportunity for American aircraft manufacturers in China, where aviation is being taken up very enthusiastically.

Aviation Field for Ogden, Utah

Ogden, Utah, has begun work on the establishment of an aviation field through the action of the city commission and the Chamber of Commerce. An option on 3,000 acres of land in Weber County near the Utah Hot Springs, has been secured and the city commission recently passed a resolution favoring the purchase of the land.

The resolution places the commission on record as obligating the city to pay $3,000 toward the purchase of the land, subject to action by the state legislature at the next session, empowering cities to purchase land for such purposes. The Chamber of Commerce is also planning aid in a financial way.

Roy L. Noggle, former captain in the aviation service for eighteen months and active in the interest of procuring the aviation field, has been named as the official to be in charge of the field. It is said that the field will be placed in readiness at an early date and be used during the summer by the aviators passing over Utah.

Connecticut Aerial Navigation Co. Operating Flying Boats

The Connecticut Aerial Navigation Company of Bridgeport, Conn., has opened up business in passenger-carrying, aerial advertising, photography, sales and service work.

The company has established a seaplane base at Black Rock Harbor, and Curtiss flying boats are used. A large passenger-carrying service is being handled and several trips from Bridgeport to New York have been made.

Delivery of packages to Meigs & Company, the American Hardware Company, and the Bridgeport Brass Company by flying boat was made recently when one of the company's boats flew from New York to Bridgeport piloted by Joseph Remson, a former Bridgeporter. Bronson H. Davis, an officer of the company and Miss Aletta K. Stout, of South Orange, N. J., came up to Bridgeport in the "Sea-Gull" with Pilot Remson. E. R. Morin, a motion picture operator, took pictures of Bridgeport from the air also.

One of the boats was chartered for delivery of newspapers by the Bridgeport *Post*, and speedy distribution was made to Westport and Fairfield. The officers of the company are W. Parker Seeley, president; Sumner Sewall, American ace, vice-president, and H. S. Thorne, secretary.

Lawson Air Service Delayed to August 15

Milwaukee.—Transcontinental passenger service by aerial liners capable of carrying 26 persons, will be instituted about August 15 between New York and Chicago by the Lawson Airline Co. of Milwaukee. The service originally was intended to start July 1 or 15, but it will not be possible to complete the first ships in time.

A larger plant has been established at South Milwaukee, and materials purchased for an initial lot of ten ships. Several changes in the original design were made, including larger motive power, but no radical departure has been necessary. Some delay was encountered in getting prompt delivery of materials, but it is now possible to guarantee delivery of the first ship by July 15 and the remainder at intervals of about two weeks, enabling the operating company to establish regular service by the middle of August. Later it is intended to establish a similar service between Chicago and the Pacific.

Ohio Air Line to Start

Louisville.—Plans for the operation of a passenger and freight service by air between Louisville and Cincinnati have been definitely formulated by promotors, by filing articles of incorporation for the Ohio Valley Aero-Transport rompany. It is planned to have several H-S2L flying boats ready for operation not later than July 15. One hundred Louisville business men and firms have subscribed for stock.

Aircraft Company Starts in Australia

Announcement is made that Messrs. Simpson & Tregilles, of Perth, West Australia, have started in the manufacture and sales of aircraft and supplies. They welcome communications from manufacturers of engines, aircraft, parts and accessories.

Aerial Service in Aurora, Ill.

The Aurora Aviation Company, of Aurora, Illinois, has purchased a Curtiss J N-40, equipped with an OX-5 engine, and has started in passenger-carrying and aerial express business. Lt. James D. Curray, pilot with A. C. Hull as passenger recently made a flight from Waukegan to Aurora, a distance of 75 miles in one hour. On the first day of passenger carrying work over twenty-five persons were taken up.

Air Service Officer Tests Safety Suit

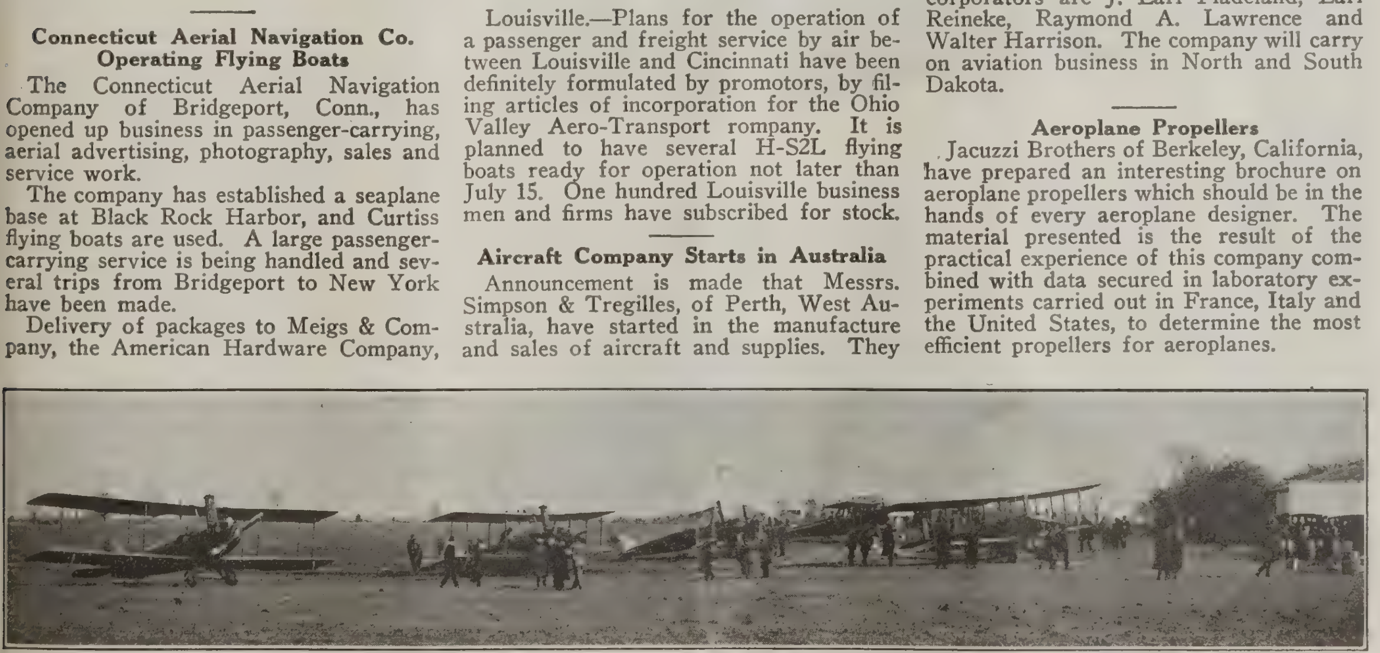
Lieut. J. B. Machle of Selfridge Field recently tested out a dreadnaught non-sinkable safety suit. This suit was designed for the use of aviators who are compelled to fly over water. Lieut. Machle jumped overboard into water registering 20° Fahrenheit and remained in the water for 35 minutes, submerging himself many times. The result of this test was very satisfactory due to the buoyancy and water proofness of the suit. The suit allows the necessary freedom of action for the pilot and its weight and bulk are not excessive enough to detract from the usefulness of the garment. In view of the fact that the U. S. Irving parachute for aeroplane pilots is now available it is of interest to state that the type of parachute harness used in connection with said parachute may be worn over the suit which is another point in its favor.

Organize Aviation Company in Fargo, N. D.

The Fargo Interstate Aircraft Corporation has been formed by several men of Fargo, to manufacture, buy and sell aeroplanes and accessories, engage in aerial transportation, conduct flying schools and similar aeronautical activities. The incorporators are J. Earl Fladeland, Earl Reineke, Raymond A. Lawrence and Walter Harrison. The company will carry on aviation business in North and South Dakota.

Aeroplane Propellers

Jacuzzi Brothers of Berkeley, California, have prepared an interesting brochure on aeroplane propellers which should be in the hands of every aeroplane designer. The material presented is the result of the practical experience of this company combined with data secured in laboratory experiments carried out in France, Italy and the United States, to determine the most efficient propellers for aeroplanes.



The opening of the Pine Valley Flying Field of the Curtiss Eastern Airplane Company at Philadelphia

IMPRESSIONS OF AN AERIAL TOUR IN AMERICA

By Lieutenant Louis Gaubert of the French Flying Corps.

I have just come back from a delightful tour in my Farman aeroplane, which I delivered to Mr. Harrison R. Tucker in North Carolina. Throughout the trip I very carefully kept my notes, and have brought back many details which should be of interest to future air travelers, and will prove that it is possible to voyage in the air with more security than in an automobile. The primary condition to convince the skeptics to try this fascinating sport—is that—it is necessary to do away with the risks of forced landings in the country; that is to say that you must have a machine which besides having a reasonable speed in the air, can be able to land slowly in a small space. Demonstrate to those skeptics the aeroplane with these qualities, and their adoption of this fascinating sport follows closely. How many trips have I seen spoiled, and the planes broken up? Why? Because it was necessary for those machines to have a large field to land in.

Should one be obliged to wear goggles, fur helmet, and bundle up like an eskimo? No. That is not my idea of aviation, war aviation perhaps, but not now. In our machine, motor and propeller in back, no breeze from the propeller or oil from the motor comes our way. Conversation goes merrily along, we are shielded from the wind, nothing hinders our admiring gorgeousness of the country—as mile after mile it unrolls beneath our feet. So, when we arrive at our objective and land we are as clean as if we had just stepped out of a comfortable limousine.

The 30th of April three of us left Mineola for Philadelphia; Mr. Clerck, my mechanic—Mathais and I. We carried a generous quantity of spare parts and each of us—a good sized traveling bag; absolutely like starting out on an automobile tour. There was a heavy head wind from the southwest and we climbed to about 2800 feet, no use of our going any higher, for if my motor stopped, I always saw under me a large enough landing field, as our Farman is very modest in its landing requirements. On the way, the wind freshened and slowed us up a good deal. The aviator's axiom of—prudence being the first requisite—before flying over Philadelphia we landed for gasoline alongside of a farmhouse on the outskirts of Trenton. The farmer, greatly interested, took five gallons away from his Ford and gave it to us. Not the very highest grade of gasoline but our motor has, since its arrival in America—like everyone else—become used to this idea of prohibition. We took the air again our motor working like a charm and southwest of Philadelphia we landed in a small aerodrome. After luncheon I took up several passengers to let them taste the pleasures of the Farman.

After changing passengers, Captain Johnston replacing Mr. Clerck, we went on to Wilmington where Mr. Paul Du Pont was awaiting us. We arrived there 35 minutes later in a driving rain, picked out a convenient landing field, came spiraling down; and carefully anchored our big bird in the field where it passed the night "a la belle etoile." A most cordial hospitality was extended to us by that distinguished sportsman, Mr. Paul Du Pont and his charming family. The next morning I took up quite a few passengers; I had the pleasure of carrying Mr. and Mrs. Du Pont and their young son, Paul. Mr. Du Pont is at heart a mechanic and was greatly interested in my brief explanation to him of Aviation. We stayed several days at Wilmington, everyone wanting to fly in the Farman.

The fourth of May, at 8 A. M., we took off for Washington, Mr. Foulk, Mrs. Du Pont's brother with Mathais and myself. At 9:25 A. M. we landed at Bolling Field and made some demonstration flights. The flying officers were very cordial. I profit by these few lines to send them my thanks.

May 6th, at 10:45 A. M., we departed from Washington for Fredericksburg, Robert Tucker, Mathais and myself. It was rather rough in the air, and we were bumped around a good deal; at 11:35 A. M. we came down in a race track on the outskirts of Fredericksburg. A Curtiss, Hizpano-Suiza motor, took off at Bolling Field at the same time as we and landed when we did at Fredericksburg. I noted with pleasure that our aeroplane was after all, fast enough.

From Fredericksburg the 7th of May in a drizzling rain Robert Tucker, Mathais and I left at 3:20 P. M. At. 4:40 P. M. we arrived at Richmond, landing in a good sized race track. There were no hangars and the rain poured on our plane all night. The next day May 8th, at 3:45 P. M. we left—same passengers—and always our baggage and spare parts. Not a single repair as yet and no mechanical troubles—absolutely none! Eventually Fayetteville loomed up in the distance. By this time it had cleared up and we rolled our wheels on the ground at 6:30, landing in a small field near the town. A nearby farmer gave us a warm welcome, accompanying it with an even warmer offer of "home brew" (of prune juice); you had to grit your teeth to swallow it—but we succeeded. It gave the farmer a delightful opportunity—to have a drink, and a good sized one too. Evidently his wife was very much the head of the house and a stalwart adherent of prohibition; wherein she differed greatly from her hospitable husband.

The next day we went up looking for Pope Field; our directions were not over precise—and we came down in a tiny clear space for further information. The officers who were awaiting us at Pope Field, we learned later, were positive that our machine was broken for no plane had ever landed in this vicinity save on the Aviation Field, without being damaged; the ground being very soft and sandy. Finally we located Pope Field which is ten miles from Fayetteville, N. C., and equipped with very fine hangars. The people are more than hospitable. There I turned the aeroplane over to Mr. Tucker, who, in spite of the fact, that it has been over a year since he has piloted, is now flying it, and has already made more than two hundred miles without the slightest trouble.

The logic derived from all of this is:—that in those sections of the country where the fields where one can land are limited, it is absolutely necessary to have machines which can land in small places without damage—either to the plane or the passengers. Then, and only then, will aerial touring develop rapidly in America. There is a lot of work ahead regarding maps, those few in existence today are most incomplete. It will also be necessary to put up hangars near the towns to shelter the machines, just as garages are necessary for automobiles. But I am positive that, with the initiative of the Americans, these necessities will quickly be provided; the moment that the general public begins to realize that aviation is not a mere passing fancy, but is here, and here to stay, proving daily its huge possibilities. And that the only means of aiding its development and encouraging air touring—is by avoiding the slightest accident, and writing in large letters the word "SAFETY," and never for a moment forgetting that in flying, "ONE IS IN THE AIR."

Mr. and Mrs. Louis Gaubert and their little daughter Gisele, with the Farman "Tourabout," in which they made a demonstration tour. Mr. Gaubert, who is a veteran French pilot, is the chief Farman pilot in America

THE FRENCH COMPETITION FOR PEACE-TIME AERO ENGINES

(Report Issued by the National Advisory Committee for Aeronautics)

THERE has been opened, starting May 1, 1919, by the Ministry of War, a competition for French aeroplane engines intended for commercial aeroplanes. The admission to the competition will be closed July 1, 1920, at which date the engines entered must have completed at least the first official bench test for determination of the power curve. The competition will be closed December 31, 1920.

The power of these engines will be included in one of three groups: 1. From 125 H. P. to 150 H. P.; 2. From 250 H. P. to 350 H. P.; 3. From 500 H. P. to 600 H. P.

The maximum weight for the propulsive unit, as later defined, and including the supply of fuel and oil for five hours' flight at sea level at full power, is to be 3.6 kilograms per horse power. The r. p. m. of the propeller must lie between 900 and 1,250 for the first class, 900 and 1,050 for the second, and 800 and 1,000 for the third. The entries for the competition were to be made to the Ministry before October 31, 1919. The maker of the entry must state explicitly that he has given attention to this set of rules for the competition, including its appendices, and that he accepts it in its entirety. The request for entry will be signed by the responsible representative of the company which builds the engine and this representative will have the power to deal with the State in all business relating to the competition.

To be admitted to the competition, the contractor of the engine must be French. His engine must be constructed in France, entirely with materials and accessories of French origin (except where deviations from this rule are authorized by the Technical Section) and using only French patents. The constructor takes all responsibility in case of suits which third parties, whoever they may be, may bring with regard to the design and parts utilized.

Each type of engine undergoes successively: 1. Eliminatory trials; 2. Preparatory trials of 25 hours, furnishing the basis for an initial premium; 3. The Final trials.

As is specified hereinafter in accordance with the importance of the tests carried out successfully, the State awards to the constructor progressive premiums, the total of which may reach 240 francs per H. P. in the first class, 280 francs in the second class, and 330 francs in the third. Finally, special prizes of which the amount is specified below and which may attain a total of from 150,000 francs to 200,000 francs, according to the power of the engine entered, will be awarded, according to their rank in the classification, to the engines which have satisfied all the conditions of the competition. The prize-winning motors will be acquired by the State.

Note 1. The amount of the prizes is given as estimated. It will be fixed definitely 15 days before the close of the entries, in accordance with the credits allowed in the budget.

Note 2. This program applies especially to gasoline internal combustion engines, but the competition is open to all types of heat engines having the same general characteristics from the points of view of power, weight, speed of rotation of the propeller, consumption of French raw materials, bulk and ease of installation in present day aeroplanes.

In case of further orders of engines of any type by the State from other companies than the original builder, the builder guarantees to limit his royalty to 5% for the first 500 engines, 2% for the next 1,000, and 1% thereafter. The builder who has entered the engine will have first chance at the orders up to the limit of his facilities for production.

Before the preliminary trial of 25 hours, the constructor will submit to the Technical Section a sealed bid giving the sale price for a possible order of 100 engines and for the various spare parts in groups of 100 each.

In not more than six months after the making of the entry the constructor shall forward to the Technical Section the following documents:

a. Estimated characteristics of Performance of the Engine
  - Power (W),
  - Crankshaft speed (N),
  - Corresponding speed of the propeller (n),
  - Estimated consumptions of fuel and oil,
    - Total weight,
    - Weight of the principal parts and of the several accessories,
    - Weight per horse power of the engine ready for use,
    - Weight per horse power of the repulsive unit,
    - Weight per horse power of the propulsive unit with all necessary provisions for 5 hours' flight (See Appendix 1).

b. General Description of the Engine.
  - Description of any very unusual features in the principle or in the construction of the engine and its accessories.

c. Designs.
  - Assembly drawings;
  - Drawings showing space consumed in aeroplane (1/5 size);
  - Longitudinal and transverse sections (full size);
  - Working drawings (full size) of the principal parts (crankshaft, camshaft, crankcase, cylinders, connecting rods, valves, reducing gear).

d. Complete calculations for the dimensions of the principal parts (crankshaft, connecting rods, camshaft, gears, ball bearings, springs).

The entry is examined especially from the following points of view:
Strength of parts;
Balancing of engine;
Bulk;
Method of mounting in the aeroplane;
Accessibility of carburetors, plugs, and magnetos;
Ease of starting;
Control of electric generator and such accessories as pumps;
Possibility of fitting a machine gun synchronizer;
Fuel feed;
Carburetors (heating, altitude correction, and nature of air intake);
Circulation of oil and grease;
Exhaust (especially with regard to the possibility of fitting mufflers or turbo superchargers);
Danger of fire;
Interchangeability of propeller hubs, magnetos and tachometers;
Controls for maneuvering.

Eliminatory Trials

After submission of the documents specified above, the motor will be admitted to take part in the eliminatory trials which will be held under the following conditions:

These eliminatory trials are intended to show whether or not the engine satisfies the conditions of the competition in respect of possibility of use on an aeroplane and of power;

They permit the determination of the characteristics of the engine and the conditions of the endurance trials (power and speed required during these tests) and the determination whether or not the engine satisfies the conditions required with regard to throttling and good operation at various speeds and in the different positions possible on aeroplanes;

They serve likewise to complete and to verify the statistical knowledge relative to the engine especially insofar as the materials used and calculations of the strength of the parts are concerned.

These trials include:

1. The verification of the raw materials.
   The constructor is to submit to the commission a specification of the qualities of the raw materials employed, and the factors of safety of the important parts. He will send to the Technical Section as a proof of these figures two specimens for tension tests and two specimens for impact test cut from the crankshaft and a like number from a connecting rod. He will also furnish two specimens for impact tests of each type of steel employed for the other important parts (reducing gear shaft, gears, etc).
2. Trials on the bench.
   The engine will carry out in the factory of the builder or in an official laboratory, at the risk of the builder and under control of the Technical Section:
   1. A test to determine the power curve with open throttle, with determination of the corresponding torques and fuel consumptions. This test will last about 1½ hours.
   2. A trial of about 1 hour to determine the curve of utilization (speeds and powers as a function of the degree of opening of the throttle) with a fan brake or propeller holding the engine down approximately to its normal speed with full throttle:
      The behavior at various speeds;
      The corresponding fuel and oil consumption;
      The minimum speed capable of being maintained for 15 min. and followed by return to full speed;
      The flexibility;
      The safety of sudden opening of the throttle.
      This test will also permit of examination of the vibrations of the engine to see that they are not dangerously large at any speed.
   3. A trial for ½ hour with a longitudinal inclination of plus or minus 15° to verify especially the operation of the lubrication system and the carburetor. The builder will furnish a sample of one liter of the fuel and the oil used. These should correspond to the qualities provided in the specifications.

After these tests the engine is dismantled, examined, measured, and weighed by the Technical Section, determination being made of the play of all bearings and of the exact dimensions of all rubbing parts. The builder will submit to the Technical Section a complete set of the working drawings of the engine with specifications for the limits of dimensions.

Preliminary Trials

The engine will carry out in the factory of the builder or in an official laboratory, at the risk of the builder and under the control of the Technical Section, five trials of five hours each, the first ½ hour at full throttle, 4½ hours at .8 of the rated power, and a final 2 min. at full throttle. After this test, the engine will be dismounted, examined and measured. If the trials have been satisfactory, the State will award to the builder a premium of 80 francs per horsepower on condition that the motor accomplishes after cleaning and reassembly another run of 20 min. or at least the first 20 min. of the first one of the final trials.

Final Trials

These will include an endurance test of a total duration of 275 hours. The first 250 hours are to be broken up in 5 runs of 50 hours each, each including eight 5 hour runs and one of 10 hours; the last 25 hours of the 275 will be non-stop.

At the end of this test the motor will be torn down, examined, measured and reassembled. These trials are to be made in an official laboratory, the State furnishing the fuel and oil and the measuring and checking instruments (the builder's instruments may be used after they have been officially calibrated and checked). The trial will be observed and carried on by the builder and his staff under the direction and observation of the Technical Section. The constructor will be responsible for all accidents which may occur to his engine and to his staff through the fault of his engine or neighboring engines. Before the beginning of the final test, the constructor must provide in advance the spare parts necessary to make repairs, even very important ones, (connecting rods, crankshafts, etc.) to the engine with a maximum delay of not over one month.

The State will award a premium of 20 francs per horse power for the first class, 30 francs per horse power for the second class, 40 francs per horse power for the third class to every motor carrying out the conditions laid down the first 100 hours of this test. Another premium of 40 francs per horse power for the first class, 50 for the second, and 60 for the third to every motor carrying out under the same conditions the first 200 hours of the test; another premium of 100, 120, and 150 francs per horse power for the three classes respectively, to every engine which accomplishes the full 275 hours. These premiums will be paid after receipt of the following documents in duplicate:

1. The assembly drawings of the engine, list of interchangeable parts, and working drawings for construction;
   Designs of dies for forgings;
   A schedule of weights of the raw materials entering into the construction of the engine;
   A schedule and drawings of the gauges required for quantity production.
2. Instructions for assembly, disassembly, and overhaul.
3. A complete drawing for a typical installation on an aeroplane, the general particulars of which will be given by the Technical Section at the time of the preliminary trials, including:
   - The engine bearers;
   - The controls;
   - The fuel tanks;
   - Fuel feed, and system of piping;
   - The radiators and water circulation;
   - The oil tanks and radiators and pressure gauges;
   - The air intakes;
   - The exhaust piping;
   - The carburetor with its air intake and any device for heating.

Notes on the Classification of the Engines

The engine which carries out under the required conditions the complete endurance test will be ranked by adding algebraically the figures defined in each of the next eleven paragraphs.

1. *Regularity of Operation.*

Each engine will be given a number containing as many units as the engine has accomplished hours of the officially observed trials, making a normal total of 300, with the following additions and subtractions.

Each trial of five hours or part thereof which is cancelled involves a penalization of 3 points, 10 hour trial a penalization of 6 points, and the annullment of the final 25 hour run carries with it a 10 point penalty.

The first 50 hour trial annulled carries a penalty of 50 points. The second trial 100 points. Each stop occurring during a trial which is not annulled involves a ½ point reduction of the merit factor.

A 5 minute delay after the time fixed for starting the run will be penalized by ½ point. A delay of from 5 to 15 minutes by ¾ point, and a delay of from 15 minutes to 1 hour by 1 point.

There will be a penalty of 2 points for each 5 hour trial not carried out at the designated hour. The replacement of any part of the engine will carry a 10 point penalty, excepting a spark plug, for which the penalty is only 5 points.

2. *Weight.*

The maximum weight per horse power permitted for the complete propulsive unit with fuel and oil for 5 hours' flight at sea level and full throttle will be 3.6 kg. per horse power (the weight of the accessories not attached to the engine during bench tests being counted as .6 kg. per horse power).

The power to be used in these calculations is the average of the powers obtained during the second ¼ hour of each of the 5 hour tests.

The total weight must not exceed 540 kg. for motors of the first class, 1260 kg. for motors of the second class and 2160 for motors of the third class; the power must not be less than 125 horse power for the first class, 250 for the second and 500 for the third.

The rewards for lightening of the engine itself are proportional to the ratio of this lightening to the weight per horse power of the engine; the bonus is based on the lightening below 2.2 kg. per horse power, and is given by the formula:

$$380\ (\log 2.2 - \log W_u)$$

where W_u is the weight per horse power of the engine alone. For example, if W_u equals 1.4 kilogram the bonus would be 74.6 points.

For the consumption of fuel and oil for 5 hours determined from the mean of all the tests the reward is established in the same way with a basic weight of 1.4 kilogram per horse power. The formula is:

$$720\ (\log 1.4\ \log W_f)$$

For example, if the fuel and oil consumption is 1.1 kilogram per horse power for 5 hours, the bonus would be 75.4 points.

3. *Wear.*

The maximum wear of the principal bearings and shafts and cylinders will be measured in hundredths of a millimeter, taking the difference between the initial and final play, and will be expressed by a figure equal to 100 times the ratio of the wear to the initial diameter. The reciprocal of this ratio constitutes the characteristics figure of the engine. The number of points awarded to each engine is 2 $(a + b) + (c + d + e)$, on condition that this sum does not exceed the total of 120, which will be the maximum number of points for lack of wear; a, b, c, d and e will be obtained by taking:

a. The crankpin bearing which shows the largest wear.
b. The main bearing which shows the largest wear.
c. The cylinder which shows the greatest wear.
d. The control shaft for pump or magneto which shows the greatest wear.
e. The valve guide which is most worn.

For the reduction gear there will be applied a penalty of 5 points per .001 of a radian for increase of play.

4. *Maximum Speed of Regular Operation.*

The motor should be throttled to its minimum for a period of 15 minutes after state of equilibrium or temperature has been reached without any change of the carburetor setting, with the same fan brake used in the endurance test, and with a speed of rotation of the propeller not in excess of one-fourth of the normal speed. For each diminution of speed of 10 r. p. m. below one-fourth there will be granted a bonus of 1 point. For each increase of 10 r. p. m. above the standard value there will be a penalization of 5 points, the maximum tolerance permitted being 20 r. p. m.

5. *Speed of Propeller*

There will be a bonus of a number of points equal to 1/40 (1250—n) for the first class, 1/20 (1050—n) for the second class, and 1/20 (1000—n) for the third class, n being the average of the propeller speeds measured at the same time as the power during the second ¼ hour of the several 5 hour trials.

6. *Loss of Power*

For any loss of power in the course of a test between the moment when the engine has reached a constant temperature (end of the first ½ hour) and the end of the trial (verification test for 2 minutes), there will be a penalization of a number of points equal to the mean loss of power in per cent.

For loss of power for the same condition between the first and the last 5 hour trial (measurements to be made in the second ¼ hour of each test) the penalty will be equal to the number of per cent of decrease of power.

7. *Increase of the Oil Consumption*

A penalty equal to 1/10 of the increase in per cent of total oil consumption for 5 hours between the first and the last 5 hour test will be inflicted.

NOTE:—The quantity of oil remaining in circulation in the engine will be determined at the end of each trial by draining the engine while still warm, turning the crankshaft over to allow the oil to drain as completely as possible. The smallest quantity thus measured will determine the weight of oil which ought to be included in the weight of the engine ready for flight.

(To be continued)

THE INVESTIGATION OF AIRCRAFT RADIATORS AT THE BUREAU OF STANDARDS

By SAMUEL R. PARSONS

Communicated by H. C. Dickinson

(*Continued from page* 478)

Fastening of Trailing Edge

The sewing together of the fabric at the trailing edge of a wing appeared to be a laborious and expensive operation, and from preliminary tests made at the factories under flight conditions it appeared that lapped and pasted fastening was satisfactory. The following tests were made to determine the efficiency of the pasted lap and the sewed trailing edge seam.

A sample of fabric doped and painted taken from trailing edge of plane was tested by passing the fabric around a 3/16-inch rod and clamping the two ends in the pulling clamps of the testing machine. The middle of the pasted joint was directly over the rod. The speed of testing was 6 inches per minute. The specimens were ½ inch wide.

The tensile strength of the doped fabric was 247 pounds per 1½ inches.

The pasted joint of the pasted seam gave way.

Further tests in the same manner were conducted on grade A cotton and grade A linen. Samples were prepared in the following manner for both grades.

1. Samples were folded back, butted against each other, and sewed with a "baseball" stitch of linen thread approximately 30 lea. The stitches were ¼ inch apart. These were made over a false trailing edge and doped with two coats of dope. The frayed surface tape was put on with the third coat and later a fourth coat added. The warp of the fabric was perpendicular to trailing edge.
2. Samples were prepared by lapping the fabric over a false trailing edge with 11 inch overlap. This was pasted with the first coat of dope. The surface tape was put on with the third coat and a fourth added. The warp of the fabric was perpendicular to trailing edge.
3. The surface tape was prepared by cutting the material 2½ inches wide and raveling ¼ inch on each side. Tape with the warp parallel to its length and with filling parallel to its length was prepared. The usual method with the warp parallel to its length is put on the trailing edge such that the filling of the tape is parallel to the warp of the wing fabric. The filling tape has the warp parallel to the warp of the wing fabric.

Sample designation	Tensile strength (pounds per 1½ ins.		Remarks	
	Sewed	Pasted	Sewed	Pasted
LINEN				
Tape warp parallel to edge...	306	193	F	S
Tape filling parallel to edge..	....	293	....	F
No tape....................	167	....	S	....
COTTON				
Tape warp parallel to edge...	281	146	F	S
Tape filling parallel to edge..	250	233	F	F

F=Fabric gave way.
S=Stitching or sticking gave way.

In view of the fact that the strength of the pasted joint is much lower than the strength of the sewed joint, it is concluded that this method of fastening is not good. This difference would probably be emphasized if the dope deteriorated. In the case of the pasted seam the number of tacks left in would proportionately increase its resistance to approximately equal the strength of the sewed seam with a number of tacks equal to the number of stitches.

For training planes, which are painted with light protecting medium and in which the stresses of flight are low, the pasted method would be satisfactory.

The effect of the properties of the surface tape as influencing the strength of the joint is interesting. In the case of the pasted joint, a tape the warp of which is parallel to the warp of the wing fabric materially reduces the shearing action on the dope paste between the tape and the fabric and consequently increases the strength of the joint.

In the case of the sewed seam, a tape the warp of which is parallel to the warp of the wing covering reduces the strength of the joint. This is probably due to the fact that more of the load is carried by the stitchings, due to the excessive stretch of the warp of the tape at any load as compared to the stretch of the filling.

SUMMARY.

For a sewed joint, at the trailing edge, of straightaway fabrics, the warp of the tape should be parallel to trailing adge.

For a pasted joint, of similar use, the filling of the tape should be parallel to trailing edge to obtain the best results.

The above assumes that the warp of the tape has much more stretch than the filing.

From this it might be assumed that a bias joint should be covered with a bias surface tape.

Aeroplane Fabric Seams

In covering the wings of a plane, it is necessary to sew several widths of the fabric together to obtain the required width. The seams having less stretch than the fabric will under certain conditions of stress carry the major portion of the load and consequently must be proportionately stronger.

The three important factors to be considered in determining the strongest type of seam applicable for this purpose are, first, the method of overlapping the edges of the cloth; second, the strength of the sewing thread, and third, the number of stitches per inch.

With the available sewing machines there are six ways in which the cloth may be overlapped, which are shown in figure 1.

The tensile strength of the seam was determined by means of an inclination balance type of testing machine. The seam was approximately midway between the clamps and perpendicular to the line of stress. Clamps were 1 inch wide and the distance between clamps was 1 inch. The rate of separation of the clamps was 12 inches per minute.

The following table shows the strength of the six types of seams in both the undoped and doped state.

Tensile strength, in pounds.

UNDOPED

(Seam designation)

	A	B	C
1..............................	84 S	81 F	79 S
2..............................	81 S	77 F	79 F
3..............................	79 F	79 F	78 F
4..............................	72 F	74 F	78 S
5..............................	87 F	78 F	77 S
6..............................	67 F	72 F	75 F

DOPED

	A	B	C
1..............................	106 S	120 F	93 F
2..............................	111 S	118 F	94 F
3..............................	114 S	116 F	107 F—S
4..............................	104 S	114 F	101 S
5..............................	111 S	118 F	104 S
6..............................	97 S	116 F	106 S

F—Fabric failed.
S—Stitches failed.

Seam A was sewed with "A" white silk, 16,000 yards per pound and having a tensile strength of 3 pounds per single strand.

Seam B was sewed with "B" white silk, 10,000 yards per pound and having a tensile strength of 5 pounds per single strand.

Seam C was sewed with No. 30, O. N. T. cotton having a tensile strength of 3.5 pounds.

The seams were sewed with two parallel lines of stitches ¼ inch apart and with 10 stitches per inch.

The comparative strength of the seams made with different numbers of stitches per inch was determined as in the previous case.

The following table shows the strength of the seam with five different lengths of stitches:

Fabric	6 stitches	8 stitches	10 stitches	12 stitches	15 stitches
Undoped.........	68	76	75	78	.74
Doped...........	77	93	97	102	95

SUMMARY.

An examination of the structure of the seams shows that the number of threads stressed is independent of the method of lapping the fabric. From this and the test results, it is concluded that any one of the six-seam designs is equally strong.

The seam No. 4 made up in the two successive steps, as shown under 7, appears to be the most satisfactory.

The seam has the advantage of being easily and uniformly made, is strong, and presents an edge to be doped which will not curl.

Ten stitches per inch using the threads experimented with is the most satisfactory number.

Reinforced Balloon Cloth

Many attempts have been made to strengthen and increase the tearing resistance of balloon cloth by means of reinforcing. The most common method has been to introduce a heavy warp and filling end about an inch apart having a much higher strength than the surrounding yarn. A tear starting between the reinforcings would supposedly tear to the nearest reinforcing in line of the tear and stop. This method was not satisfactory, due to the uneven surface taking up an uneven coating of rubber when the gas film was applied.

Another method which has met with some success has been to sew reinforcing tape on the surface of the fabric parallel to the warp and filling so that squares of about 8 inches were formed.

To determine the strongest type of reinforcing tape the following tests were made:

This method may be considered as an attempt to approximate a shock tear. The cloth was stretched on a light, wooden, rectangular frame under enough tension to take out the wrinkles and was suspended from a spring balance. A square 2 inches on a side was marked near the top of the frame. Three sides of the square were cut and the piece allowed to hang down. A 50-pound weight was attached to the hanging strip and the fabric caused to tear by reason of the weight dropping. The force transmitted by the tearing fabric, as shown by the deflection of the spring balance, was plotted autographically against the motion of the falling weight.

The warp was in the perpendicular or horizontal position, depending upon which system of threads was being torn. The cut strip was allowed to hang down on the seam side of the fabric and over the side of the fabric having no seam.

The second method was a modification of the first, in that the same procedure was followed with the exception that the tearing was induced by placing the material between the clamps of the conventional type for tensile strength testing. The lower clamp moved at the rate of 5 inches per minute.

This method is believed to be more nearly indicative of the actual performance of the fabric.

The fabric was clamped in the circular container 30 centimeters in diameter with the fabric free to deflect by reason of applied air pressure.

The material was stressed to very nearly its bursting pressure and a cut made at the center point, which started a tear. The directions and lengths of the tears were noted.

Kinds of reinforcing tested were:

Sample A.—Straight seam (tape), parallel to warp and filling.

Sample B.—Bias tape, parallel to warp and filling.

Sample C.—Straight tape, bias to warp and filling.

Sample D.—Bias tape, bias to warp and filling.

Results of tests.—When the cut strip was allowed to hang over the side of the fabric having no tape (seam) and the fabric torn according to methods one and two, the effect of the tape or seam was not noticeable.

In the case of allowing the cut strip to hang down over the seam and tearing according to the first method, the fabric tore to the tape and then followed the stitching of the tape until the strip tore off.

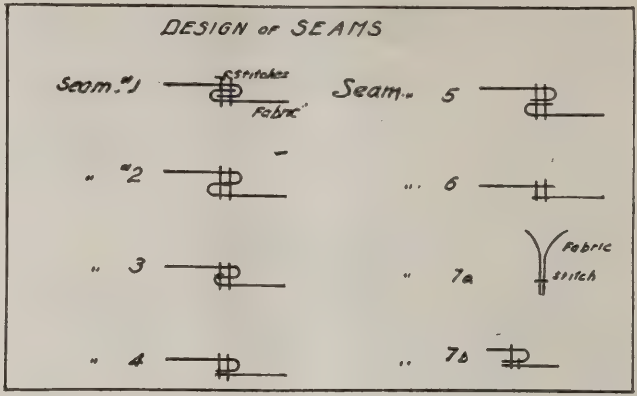
Sample A.—The tear started in the direction of filling and across the warp ends, tore down to the reinforcing tape, broke the stitches holding the tape and continued. The tear across the filling ends acted in the same manner.

Sample B.—The tear across the warp ends tore to reinforcing tape and then followed the tape until the strip tore off. The tear across the filling ends tore to the tape reinforcing, broke the stitches and then continued.

Sample C.—The tear across both warp and filling ends tore to the tape, broke the stitches and continued.

Sample D.—The tear across both warp and filling ends tore to the reinforcing tape then followed the stitches until the strip tore off.

The sample B with bias reinforcing tape sewed parallel to warp and filling gave the best results as the load required to tear the strip off at the reinforcing was slightly greater than in any of the other methods of reinforcing.



The results of tearing by these methods are as follows:

Sample A.—Tear ran through seam.

Sample B.—Tear stopped at tape (seam).

Sample C.—Tear ran under seam when intersection of two seams were at center of clamped fabric.

The tear followed the seam when the intersection of two seams was off center.

Sample D.—Tear ran under seams.

From the above experiments it may be assumed that the method illustrated in Sample B (bias tape parallel to warp and filling) is the most efficient.

Balloon Fabric Seams

The Bureau of Standards, in cooperation with the joint Army and Navy Aircraft Board, have been experimenting with various methods of making seams in the envelopes of balloons, the desired object being a seam having the necessary strength and gas tightness and having the minimum weight. This report deals with the strength of the seams.

The samples tested were made by the B. F. Goodrich Co., and the Goodyear Tire & Rubber Co., each company furnishing—

Samples of finished fabric without seams.
Samples of seams stitched and cemented, but not taped.
Samples of seams cemented and taped but not stitched.
Samples of seams cemented, taped, and stitched.

The samples submitted were two-ply fabric, one ply biased at approximately 45° to the other.

The fabrics were overlapped ¾ inch in all cases, and when sewed had two parallel lines of stitches, approximately ¼ inch apart.

The Goodrich seams were sewed with silk sewing thread, five stitches to the inch, on a lock-stitch machine. The tape used to cover one side of the seam was straight and 2 inches wide. The tape used to cover the reverse side of the seam was straight and 1½ inches wide.

The Goodyear seams were sewed with cotton sewing thread, seven stitches to the inch, on a chain-stitch machine. The tape used to cover both sides of the seam were bias and 1⅝ inches wide.

Method of test—

1. Samples of each fabric and the several different seams were tested and determinations of the bursting properties were made.
2. Strips of the plain fabric 2 by 6 inches were cut parallel to the warp and filling of each ply of cloth and the tensile strength determined.
3. Strips with the seam in the center were cut 3 by 6 inches, the long side of strip parallel to the seam and the tensile strength determined.
4. Samples of the sewing thread were tested and determination of the tensile strength were made.

Bursting test.—The fabric was palced under the annular ring of the bursting apparatus with the center of the seam coinciding with a diameter of the ring and the fabric subjected to a uniformly increasing air pressure. The deflection at the central point of the fabric or seam was plotted autographically against the pressure necessary to produce the deflection. A rubber diaphram was used under the fabric to prevent leakage of air.

Tensile strength tests.—The strips cut in methods 2 and 3 were placed in the clamps of a conventional inclination balance type of testing machine with 3 inches between clamps and the strips were caused to rupture by separating the clamps at a rate of 12 inches per minute.

The sewing thread was broken on a conventional inclination balance type of testing machine with 6 inches between jaws.

Results of tests.—The results of the determination of bursting tests are shown in Table I.

The results of the determination of tensile strength tests on the strips are shown in Table II.

The results of the determination of tensile strength tests on the sewing thread are shown in Table III.

Value of tests.—The bursting tests show the behavior of the material when it is subjected to a uniformly distributed pressure and can, therefore, be taken as a laboratory method of determining the behavior of the fabric or seam when the material is used in an inflated spherical balloon.

The deflection at any pressure shows the degree of tautness of the fabric or seam and the pressure necessary to rupture the fabric or seam may be used as a valuable index to the factor of safety.

The tensile strength tests on the fabric show the strength of individual cloths which make up the finished fabric.

The tensile strength tests on the seams show the amount of stress necessary to rupture the seam.

Discussion of results.—Table I shows the average results of the bursting tests on the fabrics and seams.

The small size of the Goodyear plain fabric samples precluded a satisfactory bursting test and the result shown is not believed to be a fair measure of their ability to resist pressure. The results of the bursting test would indicate that the Goodrich seam is stronger than the Goodyear. This may be due to the slightly higher tensile strength of the Goodrich fabric and to the wider tape used in covering the Goodrich seams.

The difference between the surface tension in the seams which were cemented and stitched and the surface tension in the plain fabric would indicate that stitching had weakened the fabric.

The slight difference between the surface tension of the cemented and taped seam and the cemented, taped, and stitched seam of the Goodyear fabric would indicate that the stitching added very little strength to the seam. A comparison of the corresponding data on the Goodrich seam would indicate that the stitching added strength.

Table II gives the average results of the determinations of the tensile strength of the plain fabric per inch width, the average tensile strength of the seams, the weight in ounces per square yard of plain fabric, and the weight in ounces per linear yard of the seams.

A comparison of the tensile strength of the fabrics shows the Goodrich fabric to be slightly stronger than the Goodyear fabric.

In stressing the Goodyear cemented and taped seam, also the cemented, taped, and stitched seam, the seams gave way at 127 pounds and 175 pounds, respectively, after which the fabric on either side of the seam carried the load. The final rupture point is shown in Table II.

It is not thought that the final rupture point should be considered in comparing the results of the two makes of seams, as the seam itself had ruptured previous to this point.

Table III shows the comparative tensile strength of the sewing threads used in making the seams. The thread used by the Goodrich Co. is stronger in all cases.

It is not thought that the difference between the use of the lock stitch and the chain stitch influenced the results to any appreciable extent.

SUMMARY.

From the results of these tests it would appear that the stitching of the seam is not necessary.

It is evident that the study of seams should be extended to include the effect of turn of load application, and the flow of the cement.

TABLE I

Make-up of sample	Goodyear			Goodrich		
	P	D	ST	P	D	ST
Plain fabric	6.0	1.64	35.1	12.7	1.95	69.1
Seam cemented and stitched	8.7	1.57	53.1	13.25	2.15	61.0
Seam cemented and taped	10.05	1.71	57.4	15.2	2.26	68.6
Seam cemented, taped, and stitched	9.75	1.60	58.4	15.1	2.06	74.5

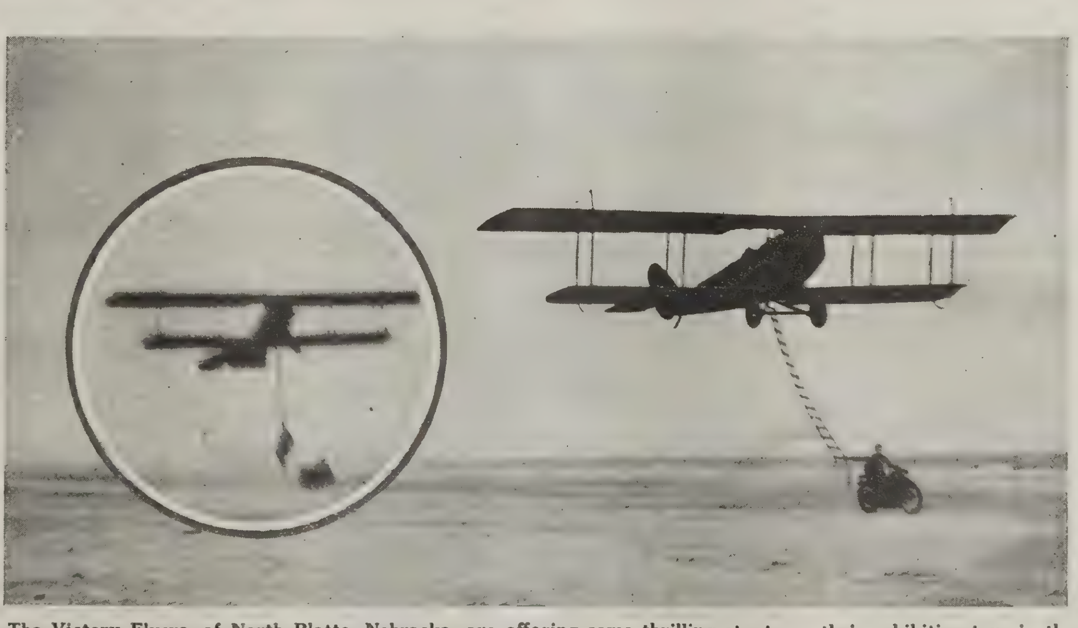
P=Pressure in pounds per square inch.
D=Deflection in inches of the center point of fabric.
ST=Surface tension in pounds per inch through the center of the fabric at time of rupture.

TABLE II

Make-up of sample	Goodyear				Goodrich			
	Warp (Lbs. per inch)	Filling (Lbs. per inch)	Strgth. of seam	Wght. (Ozs. per sq. yard)	Warp (Lbs. per inch)	Filling (Lbs. per inch)	Strgth. of seam	Wght. (Ozs. per sq. yard)
Plain fabric	......	......	......	11.2	......	......	......	10.1
Parallel cloth of plain fabric	50.3	52.0	......	......	58	58.8	......	......
Bias cloth of plain fabric	52.1	60.8	......	......	51.3	56.1	......	......
Seam cemented and stitched	......	......	139.6	.49	......	......	150.6	.50
Seam cemented and taped	......	......	240.3	1.42	......	......	177.3	1.47
Seam cemented, taped and stitched	......	......	244.0	1.45	......	......	181.6	1.49

TABLE III

Sample spool of thread marked	Number 30	Number 50	Number C-9R	Number C-10	Number C-11½
Average breaking strength, pounds	3.31-3.76	2.2-2.27	4.34	4.82	5.65-5.70



The Victory Flyers, of North Platte, Nebraska, are offering some thrilling stunts on their exhibition tour in the West. Pilot Bullock is shown changing from a motorcycle to a plane piloted by Reed E. Davis without a mishap

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(Continued from last week)

Improperly Located Road Cost Approximately $140,000 Per Mile

Mr. Storey offered to contract to build all the roads required for $15,000 per mile. Eight miles of road were built or rebuilt by Col. Disque in extending a road north from Toledo by extravagant cost-plus contractors at a cost of $26,500 per mile (No. 10), indicating the liberality of above estimates. Instead of building north from Toledo, directly into this large timber tract, a main road was built by Col. Disque starting from Yaquina Bay, the western terminal of the Southern Pacific Railway, and then extending west to Newport on the seacoast, thence north along the coast by Agate Beach, on the west side of a ridge of bluffs reaching several hundred feet in height, and touching two or three small watering places along the shore. Branches of this road were to be extended east over the divide which would reach an estimated 150,000,000 feet of spruce. Logs were then to be taken down this road about 12 miles, dumped into Yaquina Bay, and thence rafted 12 miles farther up the river to Toledo, where Col. Disque was building a sawmill that had cost the Government $821,825 when the armistice stopped operations (p. 2857). The mill was never finished. The road along the coast made a haul of about 24 miles, including rafting 12 miles. Mr. Storey, a lumberman of many years' experience, testified: "The locator of the road was either grossly incompetent, had an ax to grind, or was intoxicated" (p. 1823). Witness Hall testified Maj. Hitchcock told him "The people of Newport would wire the President if they did not get a road up to Otter Rock" (p. 1730).

Sensational testimony by Capt. Millar, January 7, 1919 (p. 2378), was presented to Maj. Ray to the effect that he was offered $11,000 or $12,000 if he would locate the road through Newport on the coast. It is significant that Capt. Millar, whose duty it was to locate this road, had located it north from Toledo over the direct route to the timber. He was promptly removed after his report was submitted, and the road was finally built around by Newport and other summer resorts at a cost of about $140,000 per mile, not counting sidetrack mileage. A few miles extension of the 8-mile road built directly north from Toledo, over comparatively easy construction, could have been built at a fraction of the cost of the Newport line and would have reached one of the largest tracts of timber on the Pacific coast. This route would have avoided rafting logs 12 miles, from Yaquina Bay to Toledo, and would have reached an inexhaustible supply of billions of feet of fir and spruce aeroplane timber. No satisfactory explanation was given the committee for the roundabout route that reached summer resorts, instead of spruce, and cost ten times as much as the route recommended by Capt. Millar before his removal.

Capt. Millar and other important witnesses could not be located by your committee. This Newport coast road, near its north terminal, was blocked by dirt slides when examined by the committee in September, 1919.

Capt. Millar was a competent engineer and fearlessly made a report in the public interest. In reference to his removal Maj. Hitchcock, under date of January 17, 1919, in a communication to Col. Disque, states:

> Capt. Millar was sent to Toledo during my absence with you in Washington contrary to my instructions at the time I left, and upon my return I immediately ordered him to return to Clatsop.

Col. Reardon, in a communication under date of January 18, 1919, to Col. Disque, stated that he was in possession of a written recommendation signed by Capt. Millar recommending the Ollala Slough route which extended from Toledo north into the Siletz Basin. It will be apparent to any impartial person who reads the evidence taken by the committee that if the officials of the Aircraft Service wanted to get spruce lumber in Oregon, all that was necessary, and the only thing to do in the public interest, was to extend the logging road directly north from Toledo into the Siletz Basin, in accordance with the report of Capt. Millar, where large spruce trees are in abundance.

Col. Disque's Lack of Knowledge

Col. Disque did not appear to be familiar with governmental operations in Oregon. He testified that the logs to be brought over the Newport Railroad would be transported from Yaquina Bay to Toledo over the Southern Pacific Railroad with which the Toledo Railroad formed a junction at Yaquina Bay. He did not appear to know that it was the intention of those in charge of operations in Oregon to transport the logs, upon arrival at Yaquina Bay, by water from that point to the sawmill being built at Toledo. He did not appear to know that a terminal and wharves and trestle had been provided and constructed at Yaquina Bay for the sole purpose of dumping logs transported over the Toledo Railroad to Yaquina Bay into the waters of the bay to be rafted 12 miles to Toledo.

He testified that there was not any large amount of spruce in the Siletz Basin (p. 1631), and that if there was it would not be possible to build a railroad over the divide to get to the spruce. He further testified that if there was spruce there, and if it were possible to construct a railroad over the divide, then the only feasible and practical thing to do would have been to extend the railroad from Toledo, north, over the divide, into the Siletz Basin (p. 1632). The evidence taken by the committee, as stated, conclusively shows that in the Siletz Basin is one of the best spruce stands in the United States and that it was feasible and practicable to construct a railroad over the divide on less than a 2 per cent grade. It is very difficult to understand why Col. Disque, who was in sole charge of governmental operations in the northwest, appeared to be entirely ignorant as to existing conditions in Oregon and as to constructive operations going on there under his charge and control.

A $2,000,000 23-Mile Logging Road

A second Government logging railway, of even more significance, was built from Yaquina Bay to a comparatively small timber tract, 23 miles south along the coast, known as the "Blodgett' tract. This road (No. 12) cost $2,086,160 for 23½ miles, or an average cost per mile of main line of $89,000, not including the sidings. This road includes one bridge over Alsea Bay, over a mile long, which some day may become a valuable adjunct to the Southern Pacific System, but is of little value for any other purpose.

The methods pursued by military officers of the Spruce Production Corporation were disclosed in this case. A singular misconception of official authority during the war caused these officers to refer to themselves and to their acts as "the Government" and "acts of the Government." This situation is strikingly illustrated in their transactions with John W. Blodgett, of Grand Rapids, Mich., a man of high character and large business dealings, who owned the timber in question.

(To be continued)

NAVAL and MILITARY AERONAUTICS

Demonstrate J. L. All Metal Aeroplanes To Army

Two of the remarkable J. L. all metal aeroplanes recently made a trip to Bolling Field, Washington, from Long Island. The machine made the flight in excellent time and upon their arrival at the army field created great interest. The machines were demonstrated to the army officials with great success. The owner, John M. Larsen, wealthy American manufacturer, engineer and designer, has purchased the patent rights for the United States, and is now manufacturing the machines for the market.

The plane promises to be highly successful. It will mean the scrapping of all wood and fabric aeroplanes. The metal plane has a factor of safety of 15. Its efficiency is demonstrated by the fact that with 165 horse power, eight persons with fuel and baggage can easily be carried. The next most efficient passenger plane, carrying the same number of persons, requires 400 horse power, and is a far larger machine.

The aeroplanes were piloted by S. C. Eaton, former aerial mail pilot, and Bert Acosta, former army and test pilot, and who is one of the most experienced flyers in the country.

The planes left later for Langley Field, Va. After demonstrating the new machines there Mr. Larsen will have the machines flown to Long Island, where his factory is located. They will be fitted with metal pontoons and flown back to Washington for demonstration to the navy.

New Field for Canal Zone Planes

A telegram was relayed recently to Prince Field through Major P. D. Prescott, requesting that the aeroplanes make a flight to Pese Herrera Province, R. P. The telegram stated that the inhabitants had cleared a level field 400 meters long and over 300 meters wide. The message was signed by B. Polo, Governor of the Province.

Photographic Mosaic of Camp Bragg Completed

The 14th Photographic Section at Pope Field, Fayetteville, North Carolina, in command of Captain John Howry has completed the photographic mosaic of the Reservation and Artillery Fire center. The mosaic covers over 400 square miles of territory and is scaled 1-10,000.

The photographs were made with the new Air Service K-1 camera taking a picture 18 x 24 C. M. This camera is a great improvement over the L type of camera 4 x 5 used for training purposes during the war, particularly because of the wide expanse of territory it covers.

In the making of this mosaic 10½ rolls of films were used, the length of which would be approximately 787½ feet, and a total of 945 exposures were made.

The entire mosaic was assembled and mounted at Pope Field and measures 16 x 6½ feet. It was made at the request of the Chief of the Artillery.

Reproductions of the original are now being made at the U. S. School of Photography, at Langley Field, Hampton, Virginia. Copies will be furnished to Artillery and other arms of the service for instructional purposes.

To Photograph Coast Line from Dirigibles

An entirely new project will soon be undertaken by the lighter-than-air department of the naval Air station at San Diego, in the way of securing maps and charts of the entire coast line from Mexico to Canada.

Dirigibles of the C-6 and B-18 types, will be employed in carrying out this topographical work from the air. The coast line of the immediate vicinity will be the first attacked, according to the comprehensive plan, drawn up, by the aerial photographer assisted by the flexible airships of the class now flying from this station. Later on, the entire coast will be covered by the lighter-than-air craft carrying expert government aerial photographers.

Navy Fliers May Use Mitchel Field

The U. S. Navy having no landing fields at its air bases suitable for land aeroplanes, and it being not convenient for the Army to accommodate the fleet air detachment at Langley Field, Va., for practice in connection with Navy activities in Hampton Roads, the Navy Department has requested the War Department to grant permission to send the fleet air detachment, flying land machines, to Mitchel Field, Mineola, L. I., this summer. If permission is granted, and there is little doubt that the War Department will be willing to cooperate in this matter, a force of sixteen Navy pilots and 100 enlisted men, with sixteen heavier-than-air machines, will be located at Mitchel Field for several months.

Commander J. D. Robnett who was in charge of the Navy exhibit at the Third Pan-American Aeronautic Congress

Tests for Aeroplane Attacks Upon Tanks

A number of interesting and instructive tests were conducted at McCook Field, Dayton, Ohio, recently to determine the relative value of bombs and the new 37-mm. cannon, when used in aeroplane attacks upon tanks from low altitudes.

Lieut. H. R. Harris in a Martin bomber on which a 37-mm. cannon, firing a one-pound shell, was mounted on the nose, flew over the target at an altitude of 100 feet, traveling 120 miles per hour while Lieut. O. G. Kelly operated the cannon. The first three shots fell a foot short; the remaining five were direct hits.

A DeHaviland-4 was flown over the target loaded with eight fragmentation bombs. Two bombs were dropped singly to obtain the range and dropped about thirty feet wide of the target. The remaining six bombs were dropped in salvo; two bombs made direct hits, and the remaining four passed over the target at a height of three or five feet, striking less than thirty feet beyond the target.

If the target had been an actual tank all six bombs would have registered direct hits. The results are quite remarkable as the test was carried out below 100 feet, at which altitude ground speed has to be contended with, plus accurate judgment in firing.

New Class to Start at Pilots' School, March Field

A new class of cadets is expected to arrive at the March Field Pilots' School soon. Preparations are being made to care for the instruction of about 100 men. Several high school graduates of the surrounding community are interesting themselves in the cadet course, some few having made application for such status.

Captain James A. Noland of the War Department Real Estate Service arrived at March Field Friday noon. He is there to complete the purchase of the school site from the Riverside Chamber of Commerce. There are 640 acres in all for which the government is paying $64,000 or $100 per acre.

Inspect Aerial Ambulance at Bolling Field.

The first hospital aeroplane in the country is now on exhibition at Bolling Field, Anacostia.

The machine was inspected recently by Surgeon General Ireland and a number of officers of the medical corps.

The aeroplane, rebuilt from the De Haviland type, carries stretchers for two patients, a physician and the pilot. The patients are carried just in the rear of the pilot's seat. They are put into the plane through doors in the side of the fuselage, one on each side, which are closed and locked when the plane takes to the air.

A number of patients have been carried by the hospital plane in Texas, where it was originally tested and proved successful.

FOREIGN NEWS

Improved Paris Aerial Services

Two new daily services of Airco aerial expresses have been started. Aeroplanes leave Croydon at 9.30 a. m. and 4.30 p. m. daily, with a similar service from Paris. New and faster Airco aeroplanes are being put on to the service, and it is anticipated that the journey between the two capitals will be reduced to two hours. At both termini cars will be waiting, and the entire journey from, say, Piccadilly Circus to the Place de l'Opéra, Paris, will be accomplished in less than four hours.

Aircraft Transport and Travel, Limited, who are responsible for this development, have made every arrangement for the comfort and convenience of travelers.

The Postmaster-General has announced the new rates and times for posting letters for Paris by air, which came into force on May 12. The rate is now 2s. per ounce for air transmission, without express delivery, and 2s. 6d. per ounce with express delivery, in addition to ordinary postage rates; letters to be marked "Air Mail" or "Air Mail Express," as the case may be.

A Swedish-Finnish Aerial Service

A regular air service between Stockholm and Helsingfors started recently when an aeroplane left Stockholm at 2 P. M. and arrived at Helsingfors at 6:30 P. M.

The 5-Engine Caudron Flies 124 Miles Per Hour

The 5-engined Caudron recently flew from Paris to St. Raphael, taking 4 hours 9½ minutes for the journey, the speed working out to over 200 kiloms. per hour (124 m.p.h.).

Seaplanes for Whaling

Copenhagen.—Seaplanes are to be used this summer for whaling and sealing between Iceland and Greenland. The machines will probably be dispatched to the field very soon.

Prepare for the Gordon-Bennett Cup Race

The French Aero Club has decided to make the contest for the Gordon-Bennett Aviation Cup an occasion of considerable importance, the cup contest forming the principal event of a sort of flying week such as were prevalent in the early days of aviation. Plans for a number of competitions have been approved by the Aero Club, and it is anticipated that the entries will be numerous. The meeting will take place outside Paris from Monday, September 27th, to Saturday, October 2nd, 1920.

Loops the Loop 962 Times Over Paris

Paris.—Aviator Fronval looped the loop nine hundred and sixty-two times recently, establishing a new world's record. Completion of the feat took him three hours and fifty two minutes.

Aviator Fronval, who looped 962 times over Paris recently

Special Type Handley Page Freighters Being Constructed

Owing to increased quantities of heavy and bulky freight being now carried to and from Paris by the Handley Page Aeroplanes a number of specially constructed freighters will soon be added to the machines employed on the Handley Page Continental Air Services, which are run in conjunction with Cie Messageries Aériennes of Paris.

They will be known as the O/11 type and will have a large freight hold with a passenger cabin for two or three at the back of it. There will be, as hitherto, two passengers carried in the nose of the machine in front of the pilot and mechanic.

Season tickets for ten (not twelve as stated last week) single flights between London and Paris can be purchased for £120.

Japan Grows Keen Over Air Travel

Tokio, Japan.—Japan has suddenly become intensely interested in the development of aeronautics within the empire. The successful flights of three army planes from Tokio to Keijo, the capital of Corea, and back to Tokio attracted the attention of the whole nation, and the establishment of aerial mail service between southern Japan and Keijo is being talked of.

It has been announced that Japan has purchased 300 French aeroplanes, which will soon be delivered. In the aviation school here French instructors have a class of about fifty Japanese officers. Scattered through the Japanese army are a few hundred graduate aviators.

Coincident with the Tokio-Seoul flight, the first formation flight, in which five Nieuport machines were used, was undertaken between Kagamigahara and Osaka, a distance of 180 miles. The outward flight was made in 80 minutes and the homeward flight in 50 minutes.

The next long contemplated flight is between Tokio and Mukden in Manchuria. When word is finally received of the approach of the aviators in the Rome-Tokio flight it is planned to send a group of Japanese aviators to greet the Italians.

Farman Wins Grand Prize of Monaco

The "Grand Prize of Monaco" for hydroaeroplanes held April 23rd-30th was won by the French Navy's entry—a Farman G.L.-41 flown by Ensign Bellot. This machine built and delivered to the French Navy in the Fall of 1918, left behind—all its fellow countrymen and foreign competitors, and was the only plane to finish in the race across the Mediterranean to Africa and back. The course was: Start from Monaco then south to Ajaccio on the island of Corsica, then a long hop across the Mediterranean to Bizert (Algeria) south over Tunis to Sousse (Algeria) returning, touching at Bizerte, Ajaccio and Monaco; approximately 1300 miles.

Fokker's Latest Creation

One of the latest products of the Dutch Fokker concern is a six-passenger monoplane limousine. The most striking feature of this machine is the very large span and the high loading combined with a cantilever wing construction. Taking into account the fact that the load per horse-power is nearly 23 pounds, the performance claimed—a speed of 93 miles per hour and a climb of 13,120 feet in 45 minutes—indicates that the bizarre placing of the monoplane surface well above the body is by no means as inefficient as is generally supposed.

Handley Page Service Very Busy

Handley Page machines on the Paris Service and those belonging to the Cie des Messageries Aériennes, have been flying lately with heavy loads of passengers, freight and luggage. To avoid disappointment it is now advisable to book seats at least a week in advance. A number of machines, however, will shortly be added to the Service.

United Kingdom and abroad,—May 1st, 1919—May 15th, 1920.

Passengers carried	4,614.
Freight carried	80,810 lbs.
Mileage covered	111,428 miles

Continental Air Service (in conjunction with Cie Messageries Aeriennes)
September 2nd, 1919—May 15th, 1920

Passengers carried	1,413
Freight carried	79,317 lbs.
Mileage covered	104,297 miles.

Before the Banks Close

A member of a big commercial house arrived recently at the Cricklewood Aerodrome near London, England at 11 a. m. asking whether it was possible for him to get to Paris before the Banks closed. A small machine was brought out and within twenty minutes of his arrival the passenger was on his way to Paris which was reached in 2 hours, 10 minutes, so giving him ample time to conclude his business. The return flight of 2 hours was made on the following morning, the machine landing at Cricklewood Aerodrome at 9 a. m.

End Rome-Tokyo Flight

Tokyo,—Lieuts. Masiero and Ferrari, the Italian aviators, completed their flight from Rome to Tokyo on May 31. Masiero arriving at 1:21 p. m. and Ferrari at 2:05 p. m.

Lieutenant Ferrari, said he would be glad to attempt a flight across the Pacific Ocean if he were able to obtain a new machine.

The aviator said that the machine in which he arrived at Tokyo was the same in which he started from the Italian capital.

China to Start Aerial Mail Lines

Shanghai, General Ting Kinn, director of the Department of aeronautics of the Chinese government, has outlined a big program of development in aeronautics for China.

Within the next year it is expected, aerial mail routes will be established between Shanghai and Peking and between Peking and Urga and the machines that will supply this service will carry both freight and passengers.

The government of China last year contracted for the purchase of 100 aeroplanes from a British concern and 40 of these have been received. Others will be delivered through the summer. General Ting said a large number of Chinese fliers are being trained at Peking and other Chinese airmen who have received training abroad will enter the service.

ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon

CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB
921 Ravenna Boulevard, Seattle, Wash.
BAY RIDGE MODEL CLUB
8730 Ridge Boulevard, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE CLUB
Bloomington, Indiana
BROADWAY MODEL AERO CLUB
931 North Broadway, Baltimore, Md.
TRIANGLE MODEL AERO CLUB
Baltimore, Md.
NEBRASKA MODEL AERO CLUB
Lincoln, Nebraska
BUFFALO AERO SCIENCE CLUB
c/o Christian Weyand, 48 Dodge St., Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicago, Ill.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bldg., Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB
455 Murray Ave., Milwaukee, Wis.
CONCORD MODEL AERO CLUB
c/o Edward P. Warner, Concord, Mass.
MODEL AERO CLUB OF OXFORD
Oxford, Pa.
CAPITOL MODEL AERO CLUB
1726 M Street, N. W. Washington, D. C.
AERO SCIENCE CLUB OF AMERICA
Beach Bldg., E. 23rd St., N. Y. City
AERO CLUB OF LANE TECHNICAL HIGH SCHOOL
Sedgwick & Division Streets, Chicago, Ill.

The R. O. G. Racing Model

The term R. O. G. is given to a model to show that it is of the type that "rises off ground." O. W. L. stands for "Over Water and Land" meaning that it could rise from water or land, and when the flight is finished alight on them as well. The O. W. L. type has a boat body with wheels attached to the sides or in some position so as to allow them to touch the ground without allowing the boat body to strike. The wheels do not affect the model much in getting off the water. A model of this kind would naturally be heavy and not many are built, but the R. O. G. type is used to a great extent, in fact almost every contest has a contest for this type of machine listed in the program.

When the model aeroplane game started way back in 1908 all the models were R. O. G. type, some having nothing but skids of bamboo or rattan to allow the model to skim along the ground and keep the propellers from touching. The Model Builders using this type of landing gear were perhaps influenced by the Wright Brothers who had a sort of sleigh runner and starting platform with weights that dropped from a height like a pile driver, pulling a cable that ran to the forward end and through pulleys, pulled the machine along the runway, which with the help of the motor in the plane speeded it up to a point where it would be lifted in the air. Wheels were thought to be dangerous at that time and Model Builders did as the older men thought right. It was not long after that wheels were attached to the lower end of the skids which decreased friction and allowed the model to get up sufficient speed in a short time, which decreased the wastage of power and the models made longer flights.

Dr. Dederer and Hereshoff, two scientific men working together, perfected a model in 1912 that had a folding landing chassis. This model made a new record for distance and was a sensation at that time, causing model designers to change their plans and experiment with this type of model.

The chassis was folded up along the frame when in flight and held in this position by rubber bands. When on the ground it was at such an angle as to allow the weight of the model to prevent it from folding. It required a little practice to determine the proper amount of tension necessary to fold the chassis as soon as the model left the ground, and not cause it to fold running over the ground. This type of chassis was the forerunner of the present retractable chassis used on large machines today.

Present day model flyers have perfected the landing chassis to a point where it is no longer clumsy or objectionable on account of wind resistance, in fact they are more efficient than the old type of R. O. G. models.

The drawing accompanying this article shows an R. O. G. model of simple design that will give the model builder an idea regarding the general layout.

The Main Frame is of the usual "A" frame construction and made of ¼ x 3/16″ spruce tied at the apex of the "V" with thread and glue. Before tying the thread a small hook is inserted and fastened in place to take the rubber motors. A cross brace is placed at a point about midway between the rear and front ends of the frame. This is a strip of flat bamboo 1/16″ x 3/16″.

At the rear a strip of spruce ⅛″ x ¼″ is inserted in slots in the frame longitudinals and fastened with glue and thread. This acts as the propeller hanger and the propeller shaft bearings are fastened to the ends of it.

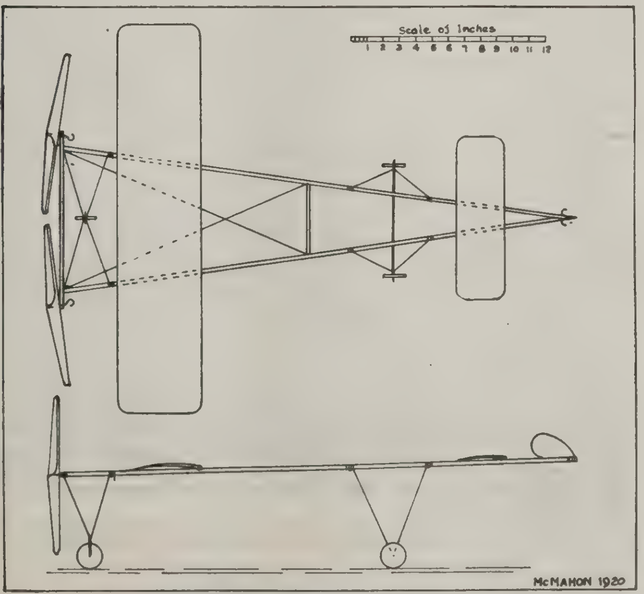
A cross wire brace runs from the middle brace strut to the rear cross struts to strengthen the frame.

The propellers are of the high pitch racing type and are 10″ in diameter.

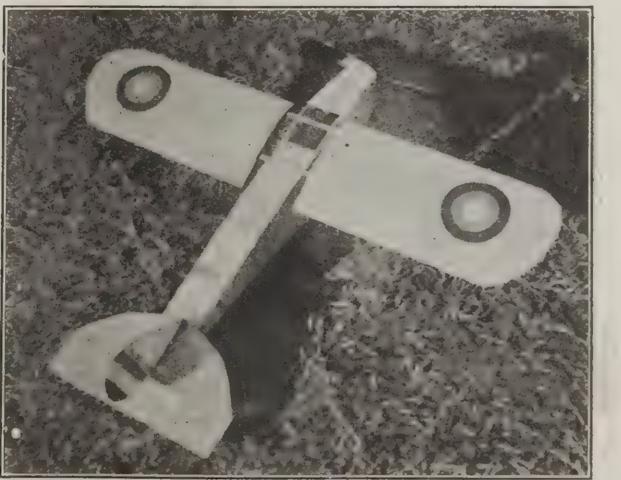
The planes are built up in the regular way with solid ribs 1/32″ thick ⅛″ square spars and on edging of thin bamboo strip. They are then covered with bamboo fibre paper and doped.

The landing chassis is built up of thin bamboo or steel wire fastened to the frame and wheels 1½″ in diameter made of cork or aluminum attached to the lower ends.

Fourteen strands of ⅛″ flat rubber is used for each propeller.



The R. O. G. racing model



A model of the Loening monoplane constructed by Edward R. Walker of Texas

Aeronitis

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Last Resource

"I'm glad there's a parachute here in case of accident," said the nervous recruit as he surveyed the plane. "but what's the idea of the prayer book?"

"Oh," answered the experienced one, climbing aboard and motioning for the other to follow, "that's just in case the parachute doesn't work."

American Legion.

You Bet

Aviator: And when we are married will we live close to your mother?

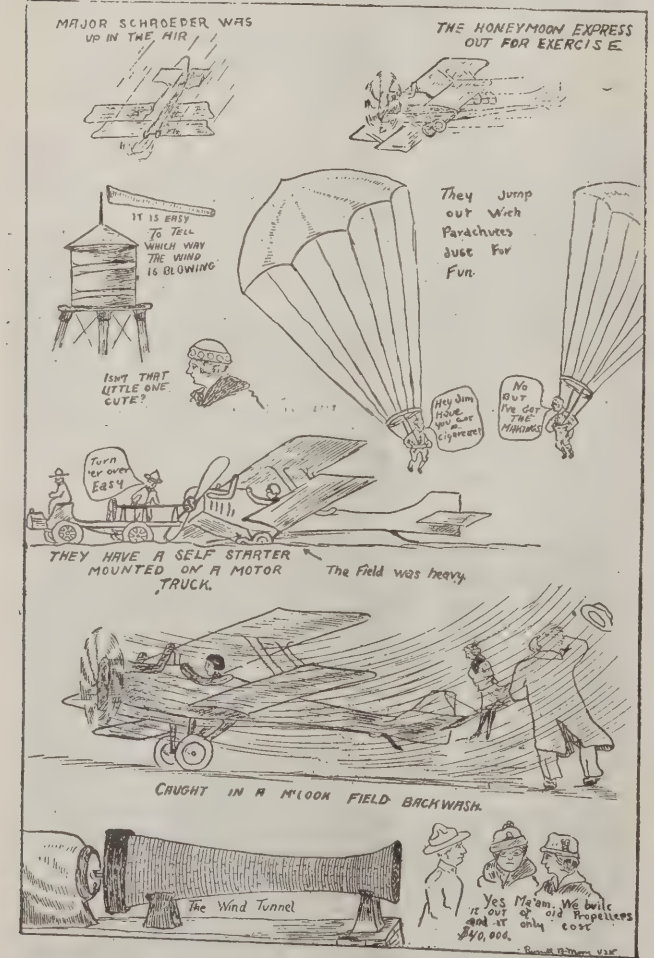
She: Yes; we will build a little bungalow along the river.

Aviator (absentmindedly): Good! Then she can slip in any time.

The Meaning

Pilot: Marriage is the logical conclusion of the average normal man.

Observer: Let's see. Conclusion means finish, doesn't it?


MAJOR SCHROEDER WAS UP IN THE AIR
THE HONEYMOON EXPRESS OUT FOR EXERCISE
IT IS EASY TO TELL WHICH WAY THE WIND IS BLOWING
They Jump out With Parachutes Just For Fun.
ISN'T THAT LITTLE ONE CUTE?
Hey Jim Have you got a cigarette!
No But I've got THE MAKINGS
Turn 'er over Easy
THEY HAVE A SELF STARTER MOUNTED ON A MOTOR TRUCK.
The Field was heavy.
CAUGHT IN A McCOOK FIELD BACKWASH.
The Wind Tunnel
Yes Ma'am. We built it out of old Propellers and it only cost $40,000.

(*Courtesy "The Naviator"*)

Impressions gained by a visit to the Army Experimental Station at McCook Field

Stickler for Details

"You two will remain here," directed the lieutenant. "We have reason to believe this trench is mined. If there is an explosion you will blow a whistle."

"Yessir," agreed the downtrodden buck. "Do we blow it going up or coming down?"—*American Legion.*

I'll Say So

If we have navigators and aviators, why not call radio men radiators?

Yea Bo

If a Yeoman Burroughs, and a Pharmacist's Mate has read Hare on the knees, can all aviators turn a Handley page?—*Naviator.*

Wanted—An aeroplane by aviator with plenty of horsepower. Box P. D. Q.

Pilot, 40 hours' experience, has had only 226 crashes, desires permanent conection with company to pilot 26-passenger aeroplane. Address—Wreck M. Easy.

For Sale—One N.G. aeroplane, without wings, fuselage, tail or engine; tail skid is O.K. Phone—Aero 12,516,347.

Question Box

Dere Ed.:—I am building an areoplain but don't see how I can connect the wheels to the engine. What do you suggest?

EL. E. VATOR.

Answer:—Put the wheels on the propeller shaft.—Ed.

Dere Ed.:—I expect to make a landing on the beach in a flying boat. How shall I take off after doing so?

C. PLAIN.

Answer:—In an ambulance.—Ed.

Who Knows

"Halt! Who is there?" rang out the challenge of the flying cadet on guard as a decidedly wobbly soldier approached the guard from the direction of a place where they "got that way."

"General Pershing," came the reply, a little thickly.

"Cut the comedy and tell me who you are before I break this gun over your fool head," demanded the guard.

But the D. and A.W.O.L. stubbornly repeated his original answer.

The next morning at the hospital they asked him why he told the guard he was the general. He replied: "Look at me as it is—what do you suppose he would have done to me if I had told him I was only a private?"—Liason.

You Said It

A puzzle in nationality had the marine recruiter in Tulsa, Okla., guessing:

Louis C. Minette, applicant for the "Leatherneck Legion," said that his mother was an American, who married a Frenchman in Italy. He was born on a ship bearing the Spanish colors while lying in the English Channel. At the age of five his parents died in Sweden and he was adopted by a German, who brought him to the United States. His adopted father is not a naturalized citizen.

"Would you class him as 'the man without a country'?" the recruiter was asked.

"Man without a country, nothing," said the sergeant; "I'd class him as a league of nations."—*Fleet Review.*

AERIAL AGE
WEEKLY

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JUL 1 1920

A Formation of Bristol Fighters, the Product of the Bristol Aeroplane Company, Which is Represented in America By Mr. W. G. Ranels

The Large Demand for Aeroplanes

UBLISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
ubscriptions: Domestic, $4; Foreign, $6 Entered as second-class matter March 25, 1915, at the Post Office at New York under the Act of March 3rd, 1879

In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

Aerial Transport Service

which, it is hoped, will eventually serve all of the important cities on the North American Continent.

The plans for this service have been developing for months and will vitally influence Civil, Commercial and Military Aviation throughout the world.

These plans are worthy of the confidence and support of all classes of Citizens, City, County, State and National Officials.

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was designed especially for the United States Navy Department for use in the war.

We supplied the Navy Department with large quantities of these instruments and their splendid record of service under all conditions as demonstrated by the famous Trans-Atlantic flight of the NC1, NC3, NC4, where the JONES AIRPLANE TACHOMETERS were standard equipment, has been highly commended by the Navy Department officials.

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The JONES AIRPLANE TACHOMETER is the lightest instrument of any type yet produced, and is geared to be driven at cam shaft or engine speed without extra attachment.

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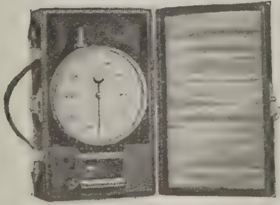

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AERIAL AGE
WEEKLY

VOL. X JUNE 28, 1920 NO. 16

TABLE OF CONTENTS

PAGE
The Large Demand for Aeroplanes. 539
Commander Bellinger and Colonel Hartz Ask Senate Investigation of Conspiracy Against Them....... 540
The News of the Week........... 541
The Aircraft Trade Review....... 543
U. S. Aerial Mail............... 544
Preliminary Report on Free Flight Tests......................... 545
The French Competition for Peace Time Aero Engines........... 548
Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures 550
Naval and Military Aeronautics... 551
Foreign News................... 552
Elementary Aeronautics and Model Notes 553
Aeronitis 554
Recent Aero Patents............. 556

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properly understood and **scientifically used** in flying training saves time, money, and wear and tear on planes, motors and instructors

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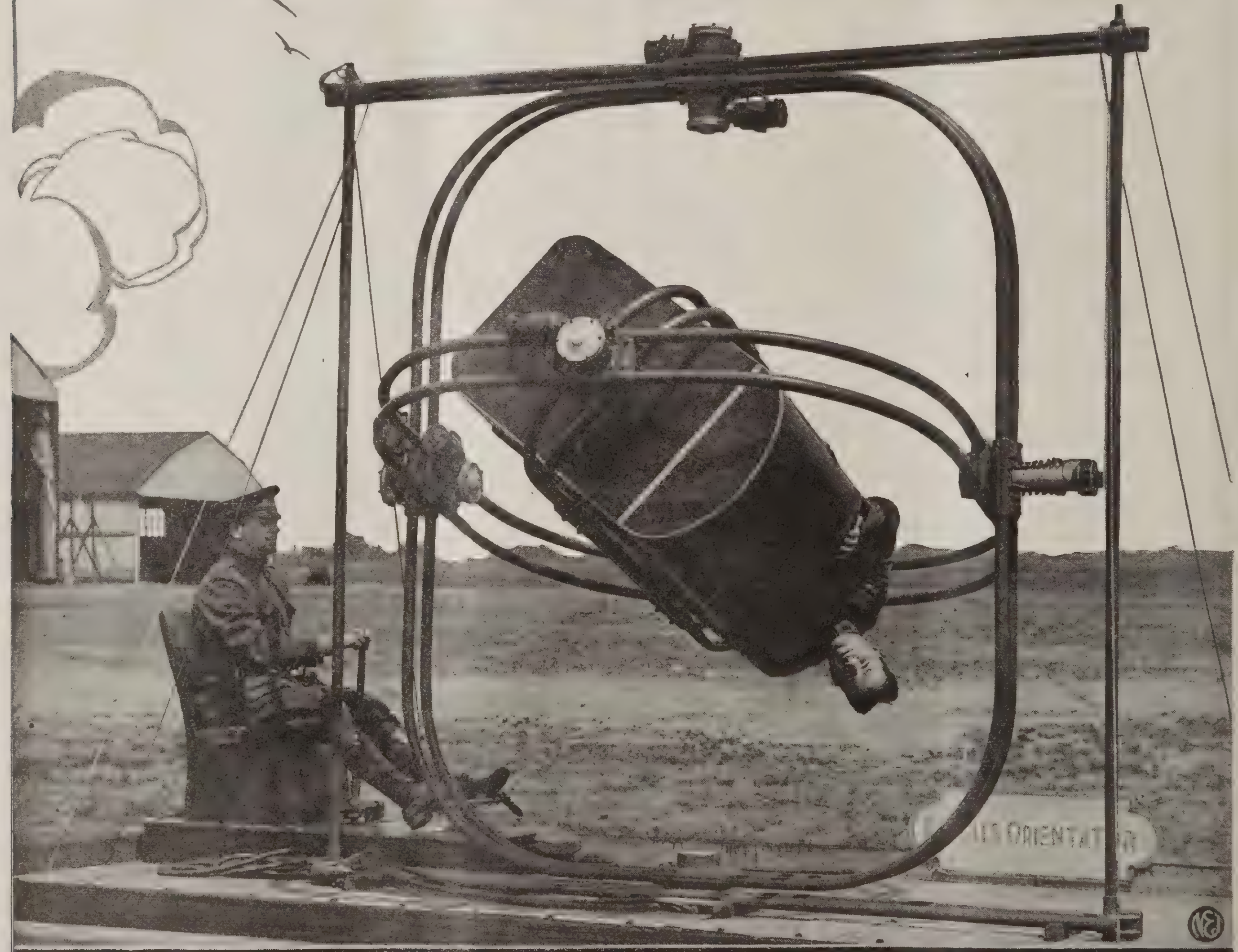
This invention **exclusively built, owned, and used by the Government during the war**, is now to become available for use in the civilian field. Some of the most successful and prominent flying instructors in America are becoming identified with this enterprise.

Personnel announced in succeeding issues



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THE LARGE DEMAND FOR AEROPLANES

TWO new firms recently placed advertisements in AERIAL AGE. They advertised aeroplanes for sale. In one case, the Aero Import Corporation, the advertisement stated that the prices would be $6,000 for single seaters and $6,650 for two-seaters.

The results were an immediate flood of orders which permitted this firm to establish itself on a firm, permanent basis.

The other firm, the Aircraft Sales Corporation, received orders for over two hundred aeroplanes and engines and offers from a number of prospective distributors as a result of two insertions of their advertisement in AERIAL AGE.

Ten Thousand American Cities and Towns Can Support from Two to Twenty Aeroplanes Each

During our recent tour of the United States, studying aeronautic interest and activities, we came in direct contact with over one hundred communities and found everywhere a strong demand for aeroplanes for passenger carrying. We found some small communities that supported one or more passenger carrying aeroplanes and the aviators in those communities told us that they were well patronized. It is conservative to state that five hundred of the largest cities can patronize and support immediately twenty aeroplanes each and ten thousand of the smaller communities will patronize and support one or two aeroplanes each.

Thousands of Large Aeroplanes Needed for Transportation of Express and Passengers

Thousands of aeroplanes are needed for the transportation of express and passengers. These transportation aeroplanes are not to be had at present, and cannot be produced this year by our manufacturers. We have been co-operating with interests that have been planning to establish aerial transportation lines this summer and have tried to assist them to get deliveries of twenty large aeroplanes of any kind. Months were spent only to find out that it would be impossible to get even six large aeroplanes on time to establish these lines this summer. And the need is for six hundred or more large aeroplanes, the largest made.

Here is where large surplus aeroplanes save the situation—and the surplus planes can be gotten out of the way this year, and put into uses which create a permanent demand for better types to be manufactured next year, when the aircraft manufacturers will have delivered their present orders and will be ready for new business.

Let the World Have All the Surplus Aeroplanes Cheap This Year and the Demand for Aircraft Hereafter Will Create a Large Aeronautic Industry

We cannot overemphasize the advisability of letting the world have all the surplus aeroplanes this year and let the world have these aeroplanes cheap enough to permit trying these aeroplanes for various purposes, in different activities in every line of human endeavor.

As has been the case during the past twelve months, the world will find the aeroplanes very useful, capable of solving some of the most difficult problems of transportation, and meeting the requirements of this intensive age when time is such a great factor in all human activities.

Out of this general use of surplus aeroplanes there will be created a permanent large demand for better and more economic aeroplanes, such as are being constructed now for civilian purposes and for general transportation.

We must not forget that to conduct an efficient aerial transportation line across the continent it will require several hundred aeroplanes larger than the largest machine being constructed today, and the manufacturing of the aeroplanes and supplying the equipment to operate a single line would be an order large enough to keep the largest aircraft manufacturer busy for a year.

This fact has been proven by Mr. Alfred W. Lawson, the eminent aircraft constructor, who during the past year flew his air liner from Milwaukee to different cities and found the interest in aerial transportation so great that he lost no time in deciding to proceed to establish aerial transportation lines, and he found that it takes a year to produce a sufficient number of large aeroplanes to establish and operate a substantial aerial transportation line. This has also been found to be true by F. Handley Page, the Vickers, Airco and Bristol Companies, Caproni, and Henry Farman, and other British, French and Italian aircraft manufacturers who have been operating air lines, as well as by the U. S. Post Office, whose figures on equipment and cost of maintenance of aerial transportation are most reliable.

There is need for half a dozen aerial trunk lines across the continent and for several hundred connecting lines.

Large Business in Supplying Spare Parts for Surplus Aeroplanes

Supplying spare parts for surplus aeroplanes will be a huge business. Lacking spare parts for even the common Curtiss training aeroplane, was almost tragic during the past six months and caused extensive trouble and loss of time to the people who had bought the 2,000 Curtiss Training aeroplanes (including the Canadian plane) during the past year.

The demand for spare parts was so great and pressing that aviators finally actually had to resort to disassemble complete aeroplanes so as to have a few spare parts to keep other aeroplanes in operation.

Supplying spare parts for 20,000 surplus aeroplanes of different types will create substantial business and will be a contributing factor to establish the aeronautic industry on a self-supporting permanent basis.

Changing aeroplanes from wheels to skids for winter flying and vice versa will in itself provide business for several factories.

Provided the aeronautic movement is permitted to develop unrestricted and reasonable attention is given to establishing aerodromes there will be a sufficient number of aeroplanes in operation by next winter to popularize winter flying.

Production of Large Seaplanes for Transportation Over Water Not Yet Begun

Producing large seaplanes would keep busy a score of large factories and these factories would have to be almost as large as ship building yards. The flying boats being planned by the U. S. Navy to be constructed this year are three times as large as the famous NC seaplanes which flew across the Atlantic and Caproni, the noted Italian manufacturer, who constructed a 25-ton seaplane to carry 50 passengers, affording them comfort and convenience such as is obtained in first class steamers, has designed and is going to build possibly in the United States a larger air liner to be equipped with 12,000 horsepower and to carry from 400 to five hundred people. In other words, aircraft are reaching such tremendous sizes that they have to be built in huge factories, like ships of the sea.

Holding Back Surplus Planes Delays Purchase of Planes for Utilitarian Purposes and is Injurious to Aeronautic Movement

It is evident that the only mistake that can be made is to hold up the surplus aeroplanes, because many people will wait to place their orders, hoping to get surplus aeroplanes cheap, and while they wait oportunities to apply aeroplanes for more extensive general use are lost, especially as the summer season will pass on with only restricted activities.

The element of time is especially important. Flying equipment must be made available early enough in the year so it can be used during the Summer and Fall flying seasons, because we have not yet made suitable arrangements for winter flying.

COMMANDER BELLINGER AND COLONEL HARTZ ASK SENATE INVESTIGATION OF CONSPIRACY AGAINST THEM

WHEN the congenial Commander Bellinger, U. S. N., Colonel Hartz, U. S. A., Major A. W. Harris, U. S. A., and the other progressive Americans associated with them, took up the pioneer work of establishing aerial transportation lines throughout the United States, they rightly felt that they were going to help the United States attain the supremacy in the air which can only be obtained by putting thousands of aviators in the air and keeping them flying.

Intensely patriotic all of them, they set to work energetically to carry out this patriotic and progressive plan without delay. The highest military and naval authorities and other Government officials were given all the details of the stupendous project which is to give the United States an extensive system of aerial transportation and is to keep hundreds of aviators and mechanics busy and in training, which will make them available to the nation in case of war.

They had, of course, every reason to feel enthusiastic about their splendid mission and the country as a whole rejoiced with them.

All went well until they tried to get deliveries of aeroplanes from American manufacturers, on time to establish the aerial transportation lines this summer. Then they found that they could not get them, that the few American manufacturers who made aeroplanes suitable for commercial transportation could not make deliveries on time to start the air lines this year. They were forced, therefore, to consider buying surplus military aeroplanes from England, France and Italy with which to start the transportation of merchandise, while making arrangements to get special American aeroplanes built to use for the passenger carrying lines in 1921.

They found themselves the objects of malicious attacks and misrepresentations launched against them by those vicious agents of the Manufacturers' Aircraft Association whose methods caused the United States Senate Committee to condemn the Manufacturers' Aircraft Association as **"vicious and designed to reap large profits by taking advantage of the Government."**

These vicious individuals were scheming to get Government subsidies and were trying to prove that there were no civilian aeronautic activities. They employed paid mourners to cry that manufacturers would have to close their large war factories unless the Government allowed them subsidies.

The progressive plans of Commander Bellinger, Colonel Hartz, Major Harris, and the other patriotic Americans seemed to show that subsidies were unnecessary, therefore these schemers proceeded to try to discredit them and circulated sinister rumors to the effect that they were part of a British conspiracy to control American aeronautics.

These false accusations were echoed on the floor of the Senate by Senator New, who was sponsor for an amendment intended to prevent the importation of the aeroplanes needed to establish the air lines this summer.

The amendment was killed and now, very properly, Commander Bellinger and Colonel Hartz have decided to run down the traducers who are responsible for the dastardly attack on their integrity. One of their first actions has been to request Senator New to start hearings in the Senate to ascertain who is responsible. The request was made in the following letter to Senator New:

Washington, D. C., June 1st, 1920.

Honorable Harry S. New,
United States Senate,
Washington, D. C.

My Dear Senator:—We are directing this letter to you because a certain amendment that you offered on the floor of the Senate to the Army Appropriation Bill and certain statements made in support thereof furnished the excuse for a widely published charge that we are a part of a British conspiracy to control the air industry of America.

We are directors of an American corporation which is owned in America, controlled by Americans, and will be used for American commerce, which was driven by necessity to contract for the purchase of British surplus airplanes when it became apparent that the American airplane industry could not furnish the required equipment.

We call your attention to the fact that Lieut.-Commander P. N. L. Bellinger, of the U. S. Navy, is secretary of the Aerial Transport Corporation; that he commanded the N. C. 1, a seaplane of the U. S. Navy, in its flight across the Atlantic; that during the war he was in command of the Naval Air Station, Hampton Roads, Virginia; that he is at present an official of the U. S. Navy on special leave; that if the charge were true, he is unfit for such service and should be branded as a traitor with such punishment as the law provides.

We demand that there be a thorough investigation by the Senate of all the facts and we further charge that the broadcast accusation which has been made against us is the result of a sinister effort on the part of some selfish and unpatriotic interests to impede the development of aviation in America, and we demand a full and public inquiry.

We call your attention to the fact that the other signer of this letter is R. S. Hartz, also a Director and Superintendent of Personnel, Rules and Regulations, in the same corporation, and formerly a Colonel in the U. S. Army assigned to the Air Service. Col. Hartz last year was selected to make the "Around the Rim Flight." We call your attention to the fact that he has been entrusted with special duties while in such service and that his devotion to America is a matter of plain and open record.

Both of us charge that the attack upon our patriotism is an assault upon the Army and Navy itself.

We charge further that the accusations of which we have been made a part are untrue and monstrous, inspired by a very selfish purpose, and we demand as a right, not only as faithful servants in the armed forces of our country, but as citizens, that there be a hearing at which the true facts may be developed. May we depend upon you to secure for us such a hearing as will permit the full facts to be made a matter of record?

Very truly yours,
P. N. L. BELLINGER,
Lt.-Commander U. S. Navy.
R. S. HARTZ,
Lt.-Col. U.S.A. (Resigned).

THE NEWS OF THE WEEK

New York City Airport Opened

New York City's first Airport was opened June 19th at Eighty-first Street and the Hudson River, while aeroplanes dipped and circled overhead and the orators soared into optimistic prophecies for the future of the port.

"This landing place may well become the center of aeroplane passenger and freight traffic to all parts of the world," said Murray Hulbert, Dock Commissioner, who cooperated with the Aerial Police Reserve in establishing the port. "From it in the near future aircraft will take passengers over three routes, to Boston, to Albany and to Washington."

Rear-Admiral John H. Glennon, commandant of the Third Naval District, saw the airport as the official gateway to the United States.

Major Charles J. Glidden, who has just returned from a trip around the world in the interest of the first Aerial Derby being organized by the Aero Club of America and Aerial League of America and who, with Alan R. Hawley, Major Granville A. Pollock, Augustus Post and Henry Woodhouse, represented the Aero Club of America at the opening, announced that he had appointed commissioners for the derby in sixty cities. He said the first trip by air around the world probably would be made next summer.

"Soon you will be able to buy a ticket on Broadway for an aeroplane trip round the world. Aviation is the coming thing in the Far East," he said. "In Hong Kong, for example, they have an air service under the police department for the purpose of hunting pirates on the river."

Major Glidden said that two American aviators in a Handley Page machine probably would make a test flight around the world this summer, preparatory to the derby. They expect to make the trip in 250 flying hours, he said. The date of their flight will depend upon reports of climate conditions in the tropical oceans.

Mayor Hylan caught the contagion of prophecy, and declared that in the future all docks built by the city would have landing places for aircraft on the roof.

The crowds were treated to exhibition flights by all types of planes. The Navy Department sent one dirigible and five seaplanes to the regatta. The Army Air Service sent fourteen aeroplanes and the America Trans-Oceanic Company sent three passenger planes.

Capt. Willoughby Flies to Newport in Triplane

Capt. Hugh L. Willoughby recently made a very successful flight from Amityville, L. I., to Newport, R. I., in his latest machine, a triplane equipped with pontoons. Capt. Willoughby has been working on this new triplane for several months. It is a two-seater machine of side-by-side arrangement, and is powered with a Curtiss OXX-6 motor.

Landing Field for Del Rio, Texas

A site of 160 acres has been selected as a permanent aviation field in Del Rio, Texas, as the result of conferences between John F. Robinson, secretary of the Del Rio Chamber of Commerce and Lieut. Morris Berman, locating aerial officer. Hangars and quarters for about 100 men and officers will be built. The site is on the direct flight line between Kelly Field and Fort Bliss.

Aerial Transport Service Between Key West and Porto Rico

An aerial route between Porto Rico and Key West with intermediate stops is now being organized by capitalists of Porto Rico and of the Dominican Republic. W. A. Aubert of San Juan, P. R., is one of the promoters of the line.

This corporation will operate a fleet of aeroplanes for mail, express and passengers, and operations are expected to start in the near future.

Two round trips each week between Porto Rico and Key West, with stops at Santo Domingo City, Port au Prince, Haiti, and Havana, Cuba, are planned. Efforts are being made to obtain a mail contract, which would be of great advantage to the islands and the United States.

Mr. Aubert, who during the war was an instructor in the U. S. Army Air Service, has been flying his own aeroplane in Porto Rico and is a very enthusiastic promoter for the new aerial line.

Columbus, Ohio, Forms Aviation Commission

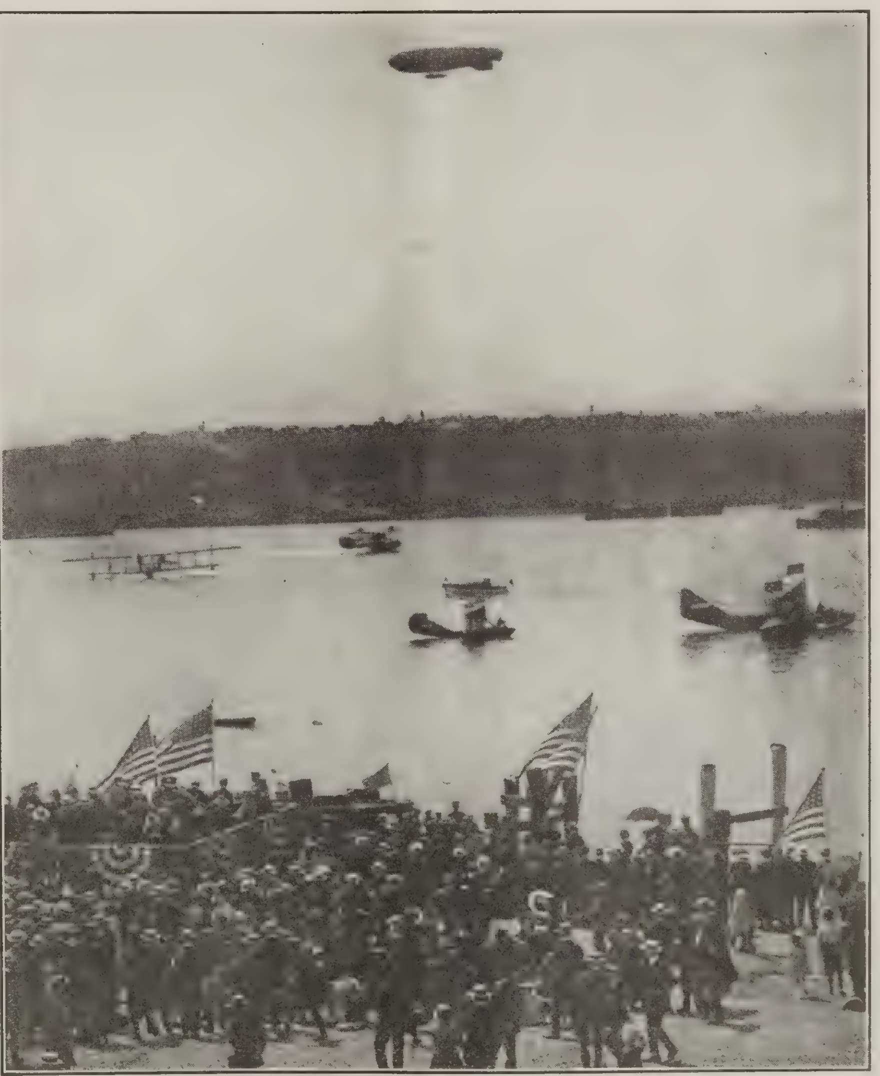
A State Aviation Commission has been established in Ohio, and Governor Cox has appointed the members of it. The commission, the first of its kind in the United States, will direct a campaign for safety in air navigation and formulate rules governing flying.

The members of the commission are Capt. Edward V. Rickenbacker, John R. Gameter, Akron; Col. Frank Hunter, Columbus; C. F. Kettering, E. H. Talbott and Col. E. A. Deeds, Dayton; Rex. L. Uden and F. B. Stearns, Cleveland.

Aero Service at New Brunswick, N. J., Active

Activities at the new aviation field established by Aviator Elliott E. Underhill at New Brunswick, N. J., have been steadily on the increase, and the new enterprise is fast taking on the appearance of a permanent institution in New Brunswick.

The hangars, which were delayed for nearly two months on account of congestion on the railroads, have finally arrived and have been set up on the field, so that the aero station is taking on a more permanent appearance. The aviators are making their permanent headquarters on



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Scene at the opening of New York City's first Airport at Hudson River at 81st Street the field and have established a gas and repair station there.

Underhill has succeeded in having his field listed as one of the regular landing places for passing aeroplanes, so that New Brunswick has obtained a place on the aviation maps of the country.

Several trips to the Jersey coast resorts have been made. The trip included stops at Asbury Park, Sea Girt and return. A special passenger service to the shore will be maintained all summer.

Aeroplanes to Inspect Power Lines

An unusual trip was recently made when a Curtiss Oriole, equipped with a K-6 engine made an inspection flight of the high tension power transmission line of the Tennessee Power Company from Chattanooga to Nashville, Tenn. The plane, owned by the Aerial Department, Chattanooga Automobile Company, of Chattanooga, Tenn., started from there with Pilot Billy Brock, and two linemen of the power company. The trip which was made as a test, resulted in a recommendation by G. S. Nunemaker, general superintendent, to high officials of the company that one plane be purchased at once to be stationed in Cleveland, and that ultimately two other passenger aeroplanes be obtained, one to be kept in Chattanooga and the other in Nashville. Mr. Nunemaker said that this experiment had proven beyond dispute that the aeroplane can be utilized by the company's linemen without even the risk encountered in automobile transportation, that the inspections can be effectively made from the air and that one plane with two linemen will take the place of twenty or more men required under present day systems of keeping long mileage of power line in serviceable condition. He said, too, that the element of time entered into his decision that the investment in these flying machines would prove profitable. The entire network of lines owned by the Tennessee company can be patrolled and closely inspected in one day, whereas it has required the better part of a week heretofore to find troubles on a single line, and a thorough inspection of the system would require two or three weeks.

Indians Take to Aviation

The famous Osage stomp dance held at Amite, Okla., won additional fame this year because some of the wealthiest members of the nation attended, going to the dance from their homes by air. The Osage Indians are the richest people in the world—that is, there is more wealth per capita among them. Their wealth is derived from oil and gas wells on their lands in the Osage nation, one of the richest mineral districts in the world.

Many of the Osage Indians have grown weary of rich limousines and touring cars and have purchased aeroplanes.

Use Aeroplanes in Politics

St. Paul, Minn.—Aeroplanes are playing an active part in the National Non-Partisan League's political campaign in Minnesota.

A. C. Townley, president of the national organization, was the first to use a plane, and as a result he was able to appear at several meetings a day.

Now another aeroplane has been purchased by the league to be used in furthering its campaign for the Republican nominations in the state primary election.

Oakley Aerial Esquadrille Giving Exhibitions

The Oakley Aerial Esquadrille, of Fort Worth, Texas, has been actively engaged in aerial acrobatic exhibitions, advertising, aerial photography and passenger-carrying service. The company exhibited recently at Dallas and has a large touring contract to complete.

Arthur Oakley does the aerial acrobatic work, and E. M. Townsend and D. A. Askew do the piloting for the stunts, H. S. Murray is business manager for the organization.

Makes Business Trip by Air

An example of the efficiency of the aeroplane was shown recently when W. G. Butler of the Butler Aviation Company of Yakima, Washington, made a business trip in three days to coast cities. By ordinary transportation facilities the trip would have taken at least two weeks.

The aeroplane, a Dayton Wright Type J-1, equipped with a Curtiss OX5 engine, was piloted by Lawrence Brown, with Mr. Butler as passenger. They left Yakima, crossed the Cascade Mountains at an altitude of 10,500 feet and landed at North Bend. They made stops at Tacoma, Chehalis, Portland, Oregon, and Dalles.

Emporia, Kan., to Have Aviation Field

The Emporia (Kan.) Chamber of Commerce has leased a 40-acre field on the outskirts of the town for a landing field for transient aviators. Several aviation schools are considering Emporia as a location because of its geographic center, and hangars probably will be built on the field in the near future.

Open Airport at Springfield, Mass.

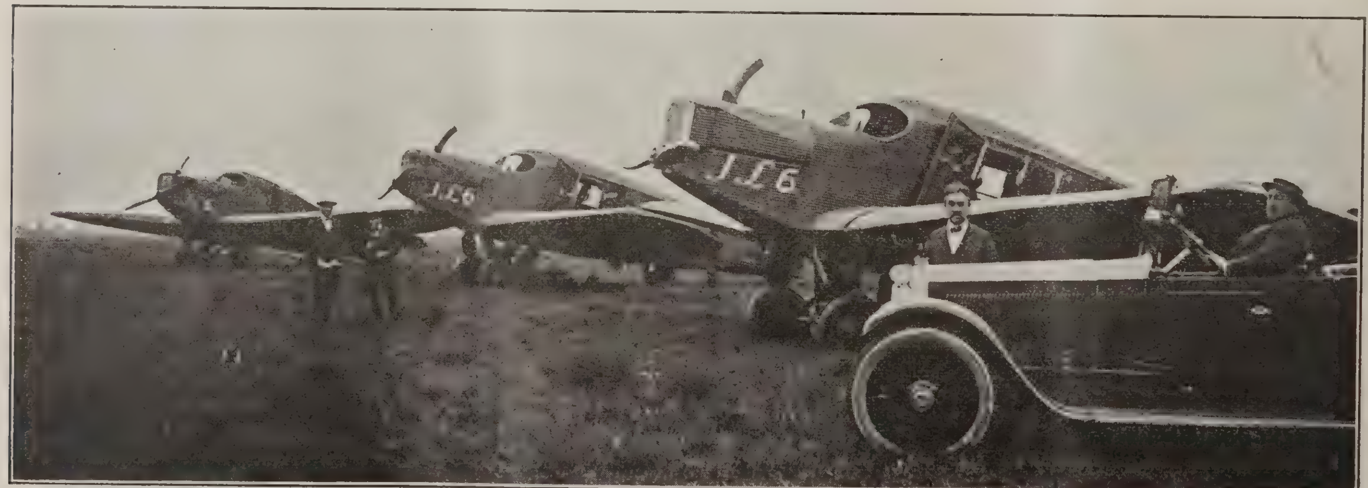
A big Aviation Day was held on June, 26th, for New England. On this day the opening of the largest Airport in New England, at Springfield, Mass., by The Eastern Aircraft Corporation, of Boston, took place. This Airport is also the official aerodrome of the Springfield Flying Club.

The new Airport is about four miles from the heart of Springfield to the south on the Connecticut River, near the Longmeadow Station and the main highway between Springfield and Hartford. The flying field is about one mile long and some two thousand feet wide, bordering the river at one of its widest parts thus forming an excellent seaplane base as well as being an Airport large enough to accommodate the biggest ships of the future. The field is marked by several 240-foot hangars painted white.

An excellent program for the day had been arranged by the Eastern Aircraft Corporation and the Springfield Flying Club, comprising exhibition flying by several well known Government pilots who flew there from Boston, New York and Washington, pleasure passenger flying for the guests and races in the JN class. Undoubtedly the great event of the day was the arrival of an all metal eight-passenger limousine JL monoplane travelling non-stop from Omaha, Neb., containing Mr. John M. Larsen, President of the JL Aircraft Corporation of New York. This new ship which proved a revelation in aircraft to the Aeronautical World at the recent Pan-American Aeronautical Exposition at Atlantic City, gave another demonstration of its wonderful performance in speed, economy, carrying capacity and construction.

In the evening, a banquet was given at the Country Club under the auspices of the Eastern Aircraft Company and the Flying Club which many prominent men of the city, state, nation and aeronautical world attended.

The officers of the Eastern Aircraft Corp. in charge of the day were: Mr. E. A. Terhune, Jr., Gen. Mgr. and Treas., Mr. W. N. Stiles, Vice-Pres., and Lieut. W. L. Keough, Operations Mgr.



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Three of the JL6 Metal Monoplanes of the J. L. Aircraft Corporation which have recently, by their remarkable performance, created widespread interest in Army and civilian aeronautic circles. J. M. Larsen, president of the corporation, is sitting in the automobile

The AIRCRAFT TRADE REVIEW

N. E. J.

Gov. Edwards Makes Flight in Flying Boat at Belmar, N. J.

Governor Edward A. Edwards of New Jersey recently took a flight at Belmar, N. J., with Col. H. S. Borden of Rumson, N. J., who is the owner of a Curtiss Seagull. Governor Edwards was much pleased with his trip and is a very enthusiastic advocate of the flying boat. Pilot Sullivan took up several other guests of Colonel Borden at Belmar, N. J., and then returned to Rumson on the Shrewsbury River.

Belmar is becoming more popular every week with owners of flying boats who are cruising along the coast, as it is the best port to land in around the vicinity of Spring Lake and Asbury Park, N. J.

A company to be known as the Atlantic Aircraft Transportation Company is being organized and will operate a passenger service between Belmar and New York City for commuters. The trip will be made in about thirty minutes. Aeromarine flying boats of the three-seater clover-leaf type will be used. Plans for a hangar and landing facilities have been completed and the service will start by July 1st.

By special arrangement with the Aeromarine Plane and Motor Company, the Belmar flying station will use their giant twin-motor flying cruiser, capable of carrying ten passengers in a luxurious cabin. All day aerial cruises starting at Belmar, and visiting Southampton, L. I., New London, Conn., and Newport, R. I., and return to Belmar are to be made, and lunch will be served on board while the plane is flying. Thus guests at Spring Lake may visit all the above places in a day and enjoy a most wonderful trip.

The Belmar station will be equipped to handle all the needs of transient flying boats, and the inauguration of the Belmar-New York City schedule will result in a very popular and reasonable method of transportation for business men at the shore resorts.

Present headquarters are at Carpenter's Pavilion, on Shark River, Belmar, N. J.

Aircraft Board Formed at Los Angeles

Los Angeles.—A department of aircraft was established by an ordinance passed by the Los Angeles county board of supervisors. It provides a commission of seven to examine air pilots and issue licenses, an aircraft inspector, punishment of violators and aerial "rules of the road."

New Aeroplane Company at Atlanta

The Atlanta Airplane Company, Atlanta, Ga., has been incorporated to build aircraft of all kind and equipment therefor.

A. V. Roe and Crossley Companies Combine

London.—The Manchester Company of A. V. Roe & Co., Ltd., makers of "Avro" aircraft, has been "unified" with the Crossley company. The Roe interests will be looked after by A. V. Roe and John Lord, and the Crossley interests by W. M. Letts (managing director) and H. B. Shuttleworth. The Roe company has a fine war built factory outside Manchester city, and were preparing to build a small, good grade car, but of which little has been seen or heard.

Zeppelin Agents Confer With Ford

Detroit.—Three representatives of the Zeppelin Company of Germany conferred with Henry Ford recently in an effort to interest the automobile manufacturer in the acquisition of the Zeppelin patents and the production of dirigibles in this country. Their names are Alfred Colsman, W. E. Doerr and O. Milarz. No result of the meeting was announced. It is understood the three men comprise half of a delegation that left Germany with the intention of interesting American capital and American manufacturers in the production of Zeppelins.

Milwaukee Wants Aircraft Industry

Milwaukee.—With the development of a commercial aircraft industry at Milwaukee arriving at the point of actual passenger service by air, the Milwaukee Association of Commerce is making a determined effort to prevent several other large cities in the United States from inducing the Lawson Aeroplane Company to move away from Milwaukee. A special bulletin issued to all of the 4,500 members of the association on June 12 said in part:

"Not many years ago, when the motor car industry was still in its infancy, Milwaukee lost more than one opportunity to secure the industry for itself by not being interested as it might have been in the possibilities of the motor vehicle.

"There are many who doubt the future of the commercial aeroplane industry, but there are also very many who believe that air transportation has already been demonstrated to be practical commercially.

"The Lawson Aeroplane Company, in a statement recently issued by Arthur Young & Co., C. P. A., shows total assets of $643,955.23. This includes the first Lawson Airliner, patent rights, drawings, machinery, equipment, land and factory building, furniture and fixtures, trucks, cash, notes receivable, accounts receivable, material purchased, prepaid manufacturing and operating expenses, factory supplies, etc. The statement further shows that of the authorized capital stock of $1,000,000, there is still unissued $364,220. Current and accrued liabilities amount to $8,175.23.

"No less than 25 cities are making very tempting offers to Lawson and almost begging him to bring his plant to them."

Landing Field in Rhinelander, Wis.

The committee appointed by the Rhinelander (Wis.) Advancement Association to arrange for an aviation field in Rhinelander has decided that the center field of the fair grounds is suitable for this purpose. The measurements of the ground are 1,045 feet long and 425 feet wide. This is a little under size for a substitute field. However, this matter is being taken up with the government. It is understood that if a substitute field is completed the government will place Rhinelander on its aviation map and give it a regular serial number.

Evening Aeronautic Courses at New York City College

Continuing the private courses in Aeronautics that he started in January 1920—Professor Harry J. Marx of the College of the City of New York is organizing Summer Classes in "Elementary Aerodynamics" and "Aeroplane Design" during July, August and September.

Enrollment can be reserved for either one or two lectures per week—Tuesday and Thursday Evenings—from 7:45 to 10:00 P. M. The courses will feature individual instruction and in addition to the more elementary work will also continue the regular "Airplane Design" course to more advanced stages. Further details can be secured by writing to Prof. Marx Engineering Dept., College of the City of New York.

One of the features of the Automobile Show at Madison, Wisconsin, was an Oriole owned by Mrs. H. R. Potter, the first woman in America to take up commercial aviation

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, General Superintendent, Air Mail Service
Herbert Blakeslee, Assistant Superintendent
John A. Jordan, Chief of Construction

J. Clark Edgerton, Chief of Flying
Charles I. Stanton, Chief of Supplies and Maintenance
Carleton A. Parker, Assistant Chief of Maintenance
George L. Conner, Chief Clerk
John A. Willoughby, Operator in Charge of Radio Experiments

Eugene Sibley, Operator in Charge of Radio Maintenance and Operation

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt
Frederick A. Robinson
Walter J. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris

Duard B. Colyer, Acting Superintendent, New York-Washington Division
Samuel F. Doane, Superintendent, New York-Cleveland Division
Walter H. Riddell, Superintendent, Cleveland-Chicago-Omaha Division
E. W. Majors, Superintendent of Repairs, Bustleton, Pa.
Eugene J. Scanlon, Manager, Air Mail Warehouse, Newark, N. J.
Paul W. Smith, Manager, Newark, N. J.
Maurice J. Kelly, Manager, Bellefonte, Pa.
Howard F. Salisbury, Manager, Cleveland, O.
Andrew R. Dunphy, Manager, Chicago, Ill.
William I. Votaw, Manager, Omaha, Neb.

PILOTS

Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen
Elmer C. Nichols
John J. McLaughlin
Harry Huking
Glenn V. Conrad
Irving Murphy
Claire K. Vance
Homer W. Johnston
William N. DeWald
Clarence C. Lange
William C. Hopson
W. J. McDonough
D. A. Martin

Authorize Aerial Mail Service from Los Angeles to San Francisco

Los Angeles and San Francisco, Cal., are now connected by aerial mail, due to the efforts of the Aero Transportation Company of Los Angeles. Special arrangements have been made by this company with the Post Office Department to carry a pouch of mail regularly every day by aeroplane.

The Aero Transportation Company is operating the large three-engined aeroplane "Avion," carrying passengers, express and now also mail.

On the first trip of the aerial mail service, Assistant Postmaster A. B. Foster of Los Angeles, was a passenger. The trip from Los Angeles to San Francisco, 110 miles, was made in 75 minutes. This demonstrated the value of aerial mail and showed that mail could be delivered at least fifteen hours earlier than if sent by train.

Mail Plane at 16,000 Feet Breaks Record for Trip

Bellefonte, Pa.—Pilot Hopson of the United States Aerial Mail Service claims to have made a record high flight recently flying from New York to Bellefonte at an altitude of 16,000 feet.

He drove a De Haviland aeroplane and carried more than 600 pounds of mail.

It took him twenty minutes to descend after reaching Bellefonte.

Aerial Mail to Abandon Heller Field

Heller Field, at Newark, will be formally abandoned as an aerial mail terminus. Orders were received by Paul W. Smith, manager of the field to transfer equipment to Hazelhurst Field, L. I. Mr. Smith was ordered also by Major L. D. Lent, General Superintendent of the aerial mail service, to go to Hazelhurst and select hangar sites and to arrange for telegraphic, telephonic, water and lighting service there. Department men figure that mail planes will be using the new field in a short time.

First Aerial Mail in Idaho

The first aerial mail in Idaho started from Pocatello, Idaho, recently. The trip was made on schedule time to Idaho Falls and return. In addition to first class mail, a few copies of a local newspaper and some advertising matter were carried. The plane, which is the property of the Furcht-Barker Aircraft Company, of Gooding, Idaho, was piloted by Hugh Barker, with J. Robb Brady as observer and custodian of the mails.

UNITED STATES POST OFFICE DEPARTMENT

NEW YORK-WASHINGTON ROUTE—AIR MAIL SERVICE

Monthly Report of Operation and Maintenance, April, 1920

													SERVICE AND UNIT COST						
Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	Gallon of Gasoline	Total Time Run		Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
														hr.	min.				
12	$10.68	$1.80	$82.34	$47.20	$28.91	$36.63	$16.45	$20.40	....	$46.24	$70.65	$361.30	38	1	55	115	3.0	$188.46	$3.14
14	....	....	82.34	47.21	28.91	36.64	....	46.50	$98.50	46.24	70.65	457.09	....	....		....	....	....	....
30	125.64	15.96	82.35	47.21	28.91	36.64	80.51	290.17	2,353.94	72.50	70.65	3,204.48	438	9	23	907	2.1	341.46	3.53
31	237.78	27.79	82.35	47.21	28.91	36.64	151.58	241.68	12.56	72.50	70.65	1,009.65	846	17	40	1,560	1.8	57.12	.65
34	274.18	36.03	82.35	47.21	28.91	36.64	246.49	244.20	29.41	72.50	70.65	1,168.57	973	28	41	2,058	2.1	40.74	.57
35	....	....	82.35	47.21	28.91	36.64	....	82.27	2,194.28	72.50	70.65	2,614.81	....	....		....	....	....	....
36	62.80	7.43	82.35	47.21	28.91	36.64	17.16	284.62	1,304.78	72.50	70.65	2,015.05	215	2	0	127	.6	1,007.52‡	15.87
43	57.12	5.00	82.35	47.21	28.91	36.64	5.72	238.32	16.50	72.50	70.65	660.92	204	0	40	50	.2	....	13.22
46	139.58	12.94	82.35	47.21	28.91	36.64	155.40	147.13	20.51	72.50	70.65	813.82	496	18	04	1,432	2.9	45.00	.57
49	27.00	.78	82.35	47.21	28.92	36.64	....	173.99	....	72.50	70.66	540.05	90	....		....	....	....	....
50	191.04	28.97	82.35	47.21	28.92	36.64	139.43	202.22	10.16	72.50	70.66	910.10	606	16	15	1,107	1.8	55.98	.82
111	95.58	1.59	82.35	47.21	28.92	36.64	45.76	149.89	4.16	100.00	70.66	662.76	341	5	20	382	1.1	124.26	1.73
51	173.27	20.29	82.35	47.21	28.92	36.64	139.14	244.59	3.66	72.50	70.66	919.23	616	16	13	1,405	2.3	56.64	.65
24227	153.32	17.00	82.35	47.21	28.92	36.64	231.66	263.16	17.02	50.00	70.66	997.94	870	27	00	2,457	2.8	36.96	.41
44305	19.60	3.20	82.35	47.21	28.92	36.64	57.92	13.80	35.00	35.00	70.66	430.30	70	6	45	400	5.7	63.72	1.08
Total	$1,567.59	$178.78	$1,235.23	$708.14	$433.71	$549.59	$1,287.22	$2,642.94	$6,100.58 †	$1,002.48	$1,059.81 *	$16,766.07	5,803	149	56	11,813	2.0	$111.78	$1.42

Cost per mile, overhead, $.37; cost per mile, flying, $.26; cost per mile, maintenance, $.79.
Note.—Cost of assembling one Liberty 12 motor from salvage and spare parts, to be placed in stock, $1,103.01.
Planes Nos. 12 and 14, Curtiss JN4H, equipped with Hispano-Suiza 8 motors.
Planes Nos. 30 to 51, inclusive, Curtiss R4, equipped with Liberty 12 motors.
Plane No. 111, Twin De Haviland, equipped with two Liberty 6 motors.
Plane No. 24227, De Haviland, equipped with Liberty 12 motor.
Plane No. 44305, Curtiss JN4D, equipped with Curtiss OX5 motor.

*Includes $106.88, covering work preliminary to the inauguration of service between Chicago and Omaha.
†Includes cost of rebuilding three Curtiss R4 planes.
‡Unusual amount due to rebuilding of plane.

OTTO PRAEGER, Second Assistant Postmaster General.

PRELIMINARY REPORT ON FREE-FLIGHT TESTS

BY EDWARD P. WARNER AND F. H. NORTON

(Report No. 70, National Advisory Committee for Aeronautics)

Description of Aeroplane Employed

IN a series of tests which have been made by the advisory committee's staff at Langley Field during the summer of 1919 with the objects of determining the characteristics of aeroplanes in flight and the extent to which the actual characteristics differ from those predicted from tests on models in the wind tunnel, and of studying the balance of the machines and the forces which must be applied to the controls in order to maintain longitudinal equilibrium, two aeroplanes have been employed. Both are advanced training machines of the JN4H type and both are equipped with Hispano-Suiza 150 horsepower engines, but they are somewhat different in structural details. The most important differences in connection with the aerodynamic characteristics of the aeroplanes are the use of an oil radiator suspended below the body and a reserve gasoline tank mounted in the center section of the upper wing on one of the machines, these accessories being lacking on the other. The machine carrying the oil radiator and the reserve tank will be referred to in this report as No. 1, the other as No. 2. In addition to the differences just noted, aeroplane No. 1 had the aluminum doors in the sides of the body, just forward of the wings, removed in order to permit of a freer flow of air through the radiator and past the engine, while No. 2 was flown with these doors in place. No cowling over the upper part of the engine was used on either machine, this being freely exposed to the air in order to dissipate as much heat as possible directly to the slip stream as it passed over the cylinder heads. Despite all precautionary measures adopted to prevent overheating, great difficulty was experienced in keeping the engine cool during the summer, and it was seldom possible to climb with the throttle fully open for more than a few minutes without raising the water temperature dangerously near the boiling point.

The two machines used are shown in figure 1, and general arrangement drawings of the JN4H are given in figure 2. The more important areas and the weights are tabulated below:

Areas	*Sq. ft.*
Upper main plane, including ailerons	203.0
Lower main plane	150.0
Ailerons (total)	34.6
Stabilizer	28.5
Elevators	21.8
Fin	3.7
Rudder	11.8

Weights	*Pounds*
Aeroplane No. 1, tanks and radiator full, seats empty	1,906
Aeroplane No. 2, tanks and radiator full, seats empty	1,844

The difference in weight is due to the larger amount of gasoline and oil carried by No. 1 and to the extra tank and oil radiator provided on that machine.

The propellers used on the two machines were nominally exactly alike, both being made from the Air Service's design No. 13,279, having a diameter of 8 feet 6 inches, and being designed for an effective pitch of 5.22 feet. Actually they were quite different, the propeller which was used on machine No. 2 in most of the work having warped so that the pitch was considerably less than it was supposed to be. The other propeller checked extremely well with the drawings, the mean blade angles for the two blades being correct within 0°.1 at all radii except within three inches of the tip, where the angle of setting was too large by 0°.35. The effect which this difference between the two propellers had on the results of the tests will be discussed elsewhere.

The most important factor from an aerodynamic standpoint is, of course, the type, form and arrangement of the main supporting surfaces. The wing section was accordingly checked up by direct measurement at several points on each machine, a frame being used which encircled the wing and provided base lines for measuring the cambers on both the upper and the lower surfaces. The section employed was nominally an Eiffel 36. Actually it varied from that curve by having a smaller camber on both surfaces. The maximum discrepancy between the Eiffel 36 and the mean wing section for the two machines was 0.006 of the chord, or approximately three-eighths inch, on the upper surface, and a very little less on the lower surface. The actual curve on the upper surface was considerably smoother than that of the Eiffel 36, the latter section having a rather abrupt change of curvature one-third of the way back from the leading edge. The mean section for the actual wings and the Eiffel 36 are plotted in figure 3 with the ordinates very much exaggerated, such distortion of the plot making it easy to detect any unfairness of the curves or any difference between them. The true form of the section used is given in figure 4.

The difference between the mean sections for the two machines was negligible, being less than 0.002 of the chord at every point, and less than 0.001 at most points. Aeroplane No. 2 had a smaller camber than No. 1 on the whole upper surface and on the larger part of the lower one. Although the differences happened to counterbalance each other so that the mean sections were nearly identical, the extreme divergencies between the cambers at corresponding points on the different wings were by no means negligible. For example, the ordinates for one lower wing on No. 2 were uniformly greater than those for the other lower wing on the same machine, the difference sometimes amounting to as much as 0.004 of the chord. It is improbable that wings can be manufactured by ordinary production methods with a greater uniformity of section than that found in these two machines, and, even if they could be made originally with greater accuracy, wooden ribs will not hold their curvature exactly when submitted to varying climatic conditions. Wind tunnel experiments indicate that the effect of changing the camber of an aerofoil by 0.004 of the chord is seldom serious, so long as the surface retains a smooth curvature, except in very thick sections such as are used in propeller blades and in internally braced aeroplanes such as the Fokker biplane and triplane. It appears to be fair to assume that the differences in section among the

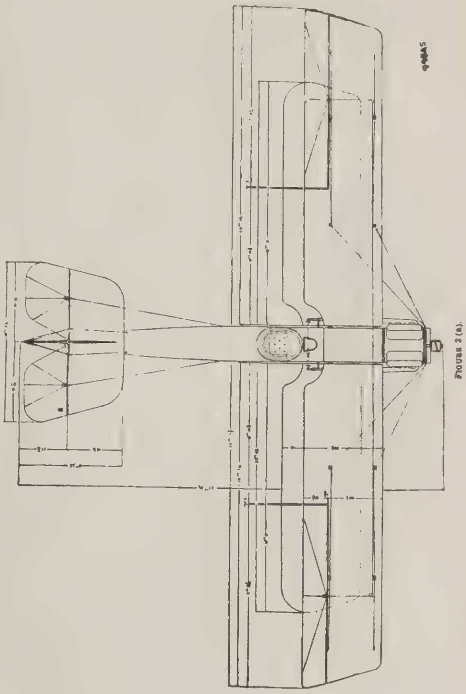

Fig. 2 (a)

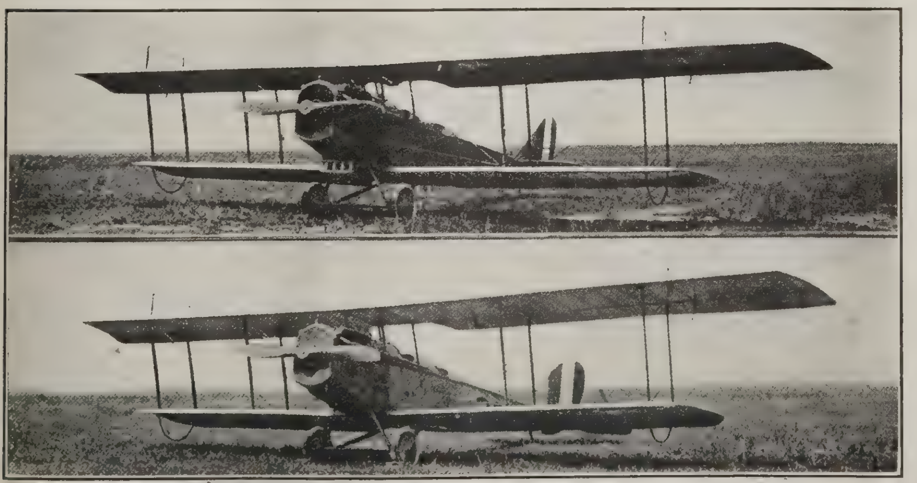

Fig. 1

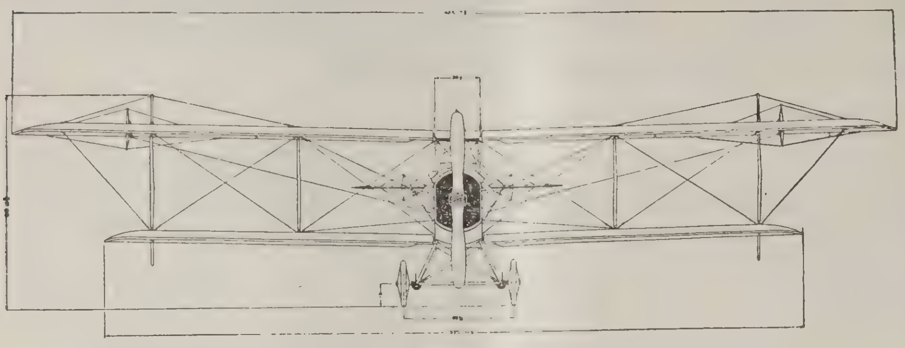

FIGURE 2 (b)

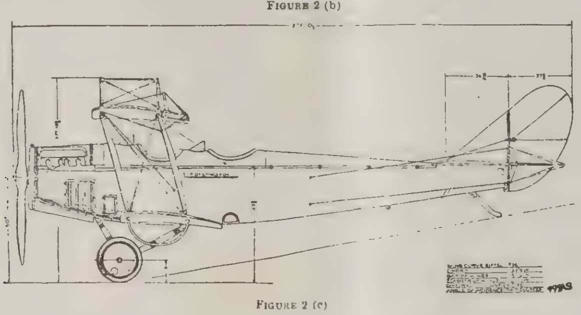

FIGURE 2 (c)

wings used on these machines will have no effect on their characteristics and that the mean section, as shown in figure 3, can be assumed to exist at all points.

The discrepancy between the actual form of the wing section and the curve on which it was supposed to be based points a dual lesson. In the first place, it draws attention to the need of making wind-tunnel models to represent the aeroplane as it is actually built, or to be built, not merely according to specifications which the shop may find itself quite unable to follow. It is of little use to construct model aerofoils accurate to within 0.002 inch if the full-sized wing which they represent departs by as much as three-eighths of an inch from the section which it is supposed to follow. Secondly, these measurements should serve to remind experimenters engaged in the design of wing sections of the futility of drawing forms which it is impossible to construct by ordinary methods. For instance, no aeroplane wing is constructed with the upper and lower surfaces running out until they intersect in a perfectly sharp trailing edge. Indeed, it is practically impossible to construct a model aerofoil for the wind tunnel with such a trailing edge, yet aerofoils are repeatedly drawn up in such forms. The result is that the model maker exercises his own judgment as to the extent to which the trailing edge should be rounded over, the aeroplane builder introduces a strip of wood or of steel tube for a trailing edge, and the drawing, the model, and the full-sized wing are likely ultimately to be of three quite different forms.

In the JN4H, the thrust line is parallel to the top longerons, and the stabilizer, which is flat on its lower surface, lies directly on the longerons. A detailed discussion of the actual form and setting of the tail surfaces is of interest primarily in connection with the longitudinal balance of the machine, and it will be reserved for treatment in connection with that subject. The wings are nominally set at an angle of 2° to the top longerons, but the mean angle of incidence in both of the machines used in this work was somewhat greater than that, being 2°.25 in No. 1 and 2°.4 in No. 2. The variation of incidence along the wing, due to warping, to slightly imperfect rigging, and to the droop provided in the left wing to balance the propeller torque, was about 0°.3. The ailerons were rigged as nearly as possible to form a continuation of the upper wing, so that, when the stick was centered, the angles of incidence of the portions of the upper wing which carries the ailerons were very nearly the same as for the inner part of the wings. A small change in the rigging of the ailerons when in the neutral position has a marked effect on the lift and drag coefficients of the wings.

Calibration of Instruments

The first step in the making of any tests is necessarily a study of the accuracy and a determination of the calibration curves of the instruments employed. The standard instruments, used in all tests, are the altimeter, the tachometer, and the air-speed meter. The altimeter can readily be calibrated in the laboratory under a bell jar. Since the altimeter was used, in most of these experiments, only for determining the density correction, and since most of the work was carried out at less than 4,000 feet altitude, the permissible percentage error in altitude determination was quite large. An error of 130 feet in the altimeter reading, or more than 4 per cent at 3,000 feet, affects the density determination by only one-half per cent. The effect of such minor factors as the decrease of static pressure in the cockpit, due to the slip-stream velocity, can therefore be neglected. It is usually possible, at the time of calibrating the altimeter, to adjust the instrument so that the errors are negligible in such work as this at altitudes of less than 4,000 feet, and the scale readings can therefore be used directly without resort to a calibration curve.

The tachometers used were made by the Van Sicklen Co., and were of the chronometric type. No calibration of these instruments was adjudged necessary, as the readings of the instruments in the front and rear checked, and as a chronometric tachometer can generally be counted on to give readings very nearly correct so long as it gives any readings at all. If anything goes wrong the instrument usually stops recording entirely.

The calibration of the air-speed meters presents a much more serious problem than does that of either of the instruments just discussed, for several reasons. There are several possible sources of error in the air-speed determination. In the first place, the meter itself may be in error initially or may go wrong after some use. Errors of this type can be determined by calibration of the meter in a wind tunnel. In the second place, the pitot or venturi tube used for measuring the velocity head being located close to the machine and in air disturbed by the passage of the wings the velocity of the air past this tube is, in general, different from the velocity of the aeroplane relative to the undisturbed air. For example, the vortex theory of sustentation declares that there is, superposed on the rectilinear flow of air relative to the wing, a cyclic flow around the wing, so that the relative air speed above the wing is higher, and that below the wing lower, than the speed through undisturbed air. An air-speed meter having its head placed close above the wing would therefore give too high a reading, no matter how closely the instrument might have calibrated in the laboratory. Finally, the air-speed meter will not give a perfectly correct reading if the axis of the head is not parallel to the relative wind direction

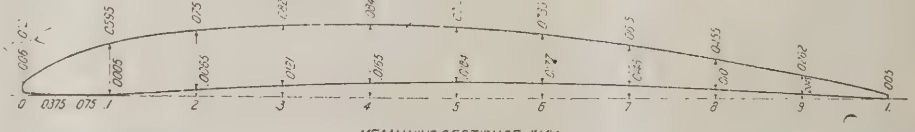

FIGURE 4

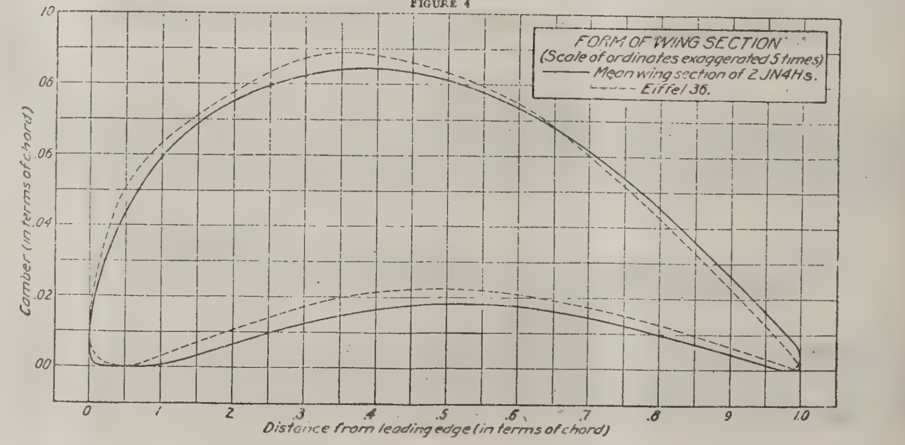

FIGURE 3.

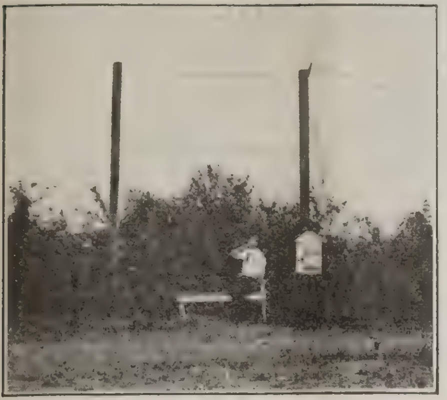

Fig. 5. Speed course observation station

at that point. Inclination of the head to the relative wind results from the diversion of the air flow by interference, a diversion which extends to a considerable distance forward of the wings, and also from the changing attitude of an air-speed meter head fixed in the machine as the angle of attack is altered.

Since practically all free-flight testing requires the determination of the air speed from a meter the accuracy of that instrument is of great importance. In the determination of lift coefficients, for example, an error of one-half mile an hour in the measurement of the air speed at its mean value (about 65 miles per hour for the JN4H) has as bad an effect on the final result as would an error of 400 feet in the altitude determination. It is essential, therefore, that the instrument be calibrated in place on the airplane and that the calibration be repeated at intervals to guard against changes in the meter.

The air-speed meters used in these tests were Bristol instruments. They were graduated with a division at each mile, but the scale was uniform enough and open enough so that it was easy to estimate the reading to half a mile an hour. The heads were pitot-venturi tubes of the standard Army type, and were mounted on the left inner forward interplane strut, about 18 inches above the lower wing. The inner strut is preferable to the outer one because of the smaller length of tubing required to make connection to the meter and also because the flow of air at the inner strut is more nearly parallel to the plane of symmetry of the aeroplane, the relative air velocity at the outer strut having a considerable component parallel to the Y axis, which would cause the air to strike the tubes obliquely and so give false indications.

There are two classes of methods used for calibrating air-speed meters in position. The first, much used by the British, involves the use of a camera obscura for the determination of speed over the ground. The speed with which the image of the aeroplane crosses the field of view can be measured with great accuracy, but the ground speed for a given rate of travel of the image is directly proportional to the altitude, and the altitude must therefore be determined within one-half per cent or better, an accuracy beyond the reach of any altimeter. The altitude can best be determined by the use of a second camera obscura or of a theodolite in conjunction with one camera obscura, the vertical angles of the plane as seen from two different points at the instant when it crosses a line connecting those two points giving the necessary data for computing the altitude. The effect of the wind can be determined and corrected for either by measuring the velocity of a puff of smoke fired from the aeroplane or by flying across the field of view in three different directions, one after the other, and measuring the ground speed in each direction. There is only one camera obscura at Langley Field, and it was not deemed advisable to secure another. The camera obscura therefore has not been used for calibrating the air-speed meters in these tests.

The second method, and the one so far used in the work of the National Advisory Committee, is simpler and more direct, requiring only the timing of the aeroplane over a measured course. The course laid off at Langley Field is 5,600 feet long, and two horizontal wires, one directly above the other and about 3 feet apart, are carried on poles at each end. One of these observing stations is shown in figure 5. The aeroplane was flown over the course at an altitude of from 200 to 1,000 feet, the higher altitudes generally being used at the lower speeds, where there was some danger of stalling or side slipping or starting a spin. The pilot kept the speed as nearly constant as possible and the observer recorded the air-speed meter reading every 5 seconds. Two or three runs were made in each direction at each speed, the speeds at which the meter was calibrated being spaced about 5 miles per hour from the maximum down to the minimum. The ground speed of each run is determined by observers at the ends of the course, the two stations being in telephonic communication. The effect of the wind is eliminated, assuming that its direction and velocity do not change between runs, by computing the mean air speed for successive runs made approximately at the same speed and plotting it against the mean ground speed for the same runs. This method is much more satisfactory, when the pilot is skillful enough to make his runs at air speeds very nearly uniform and close to the desired speeds, than any attempt to measure the component of wind velocity along the course and correct each run for the effect of that component, as both direction and velocity of the wind are so subject to change with altitude that measurements within 50 feet of the ground give little information as to the conditions existing at three or four hundred feet. If the wind is blowing across the speed course, or at an angle to it, the machine should be kept pointed along the course and allowed to drift rather than being headed into the wind in such a way that the path over the ground will be parallel to the course. The right and wrong methods are shown in figures 6a and 6b, where W is the vector representing wind velocity, A the air speed, and G the resultant speed over the ground. In figure 6b the air speed is greater than the component of ground speed parallel to the course, in whichever direction flown, and the timing over the ground of a machine flown in this manner would therefore give too low a mean true speed. In figure 6a, on the other hand, the two quantities just mentioned are exactly equal.

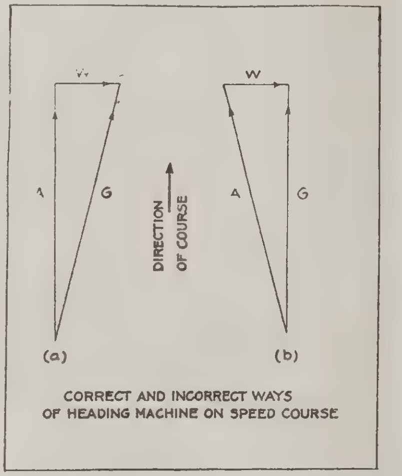
W
W
A
G
DIRECTION OF COURSE
A
G
(a)
(b)
CORRECT AND INCORRECT WAYS
OF HEADING MACHINE ON SPEED COURSE

FIGURE 6.

The calibration curves found in this way for the meters in the rear cockpits of the two machines are plotted in figure 7. It will be observed that they follow the same general form, the relative displacement between the two curves probably being due to an error in one of the instruments. It might be expected that the meter would read low at very low speeds and large angles of attack, due to the inclination of the head to the relative wind, but it actually appears to read high. This result has been obtained in tests on both aeroplanes, and there is little doubt of its accuracy, although the error in calibration at low speeds is greater than that at high, both because the effect of wind variations is more marked at low speeds and because it is difficult for the pilot to hold a straight course over the ground while flying at large angles of attack. In Fig 8 the corrections to be applied to the air-speed meter reading are plotted against indicated speed, these curves serving to give a clearer idea of the extent of the errors involved in the direct application of uncorrected meter readings than do those of Fig. 7.

When tests are made at high altitudes, where the difference between the indicated and true air speeds is large, the meter calibration correction should be applied to the indicated speed first, and the result thus obtained should be multiplied by the density correction to give the true speed. This order of procedure is necessary because the flow of air about the wings, and therefore the interference effect on the instrument readings, depends on the indicated, not the true, air speed. The meter calibration curve varies somewhat with changes in the loading of the machine, as such changes alter the relation between the angle of attack and the indicated speed, but the effect of any ordinary variations in flying load is too small to be taken into account.

(To be continued)

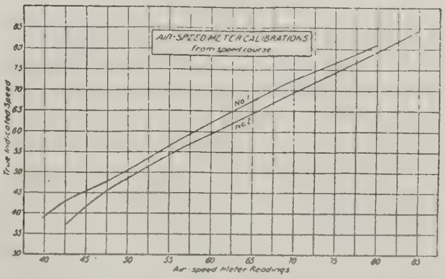

FIGURE 7.

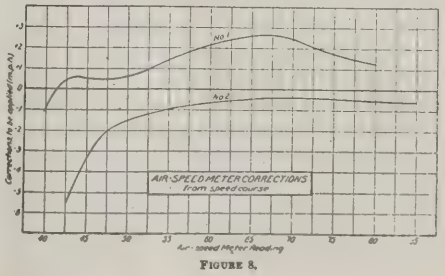

FIGURE 8.

THE FRENCH COMPETITION FOR PEACE-TIME AERO ENGINES

(Report Issued by the National Advisory Committee for Aeronautics)

(Continued from page 510)

8. *Heat Dissipated Per Horse Power by the Cooling Water*

A bonus of 5 points per calorie below 10 calories per horse power per minute carried off by the water will be awarded, while a penalty of 5 points will be inflicted for each calorie above 10 calories per horse power per minute.

NOTE:—The standard corresponds to a heat loss equal to 95 per cent of the brake horse power.

9. *Sale Price*

(a) Construction. The engines will be grouped according to the weight of special alloy steels used per horse power. Let W be this weight for a given engine and W_M and W_m be the maximum and minimum weight used on engines of the same class (the weight is taken from the fabricated parts). There will be awarded to each engine a bonus equal to:

$$5 \times \frac{W_M - W}{W_M - W_m}$$

(b) Overhaul. A penalty of not more than 30 will be inflicted on each engine according to the value P of the parts replaced (the prices being taken from the sealed bids submitted by the constructor). This penalty will be determined by the formula:

$$50 \times \frac{P - P_m}{P_M - P_m}$$

where P_M and P_m are analogous to W_M and W_m in the formula just given.

10. *Head Resistance and Bulk*

There will be a bonus of ½ point for each square decimeter by which the maximum area projected on a plane at right angles to the line of flight is reduced below 1 square meter or for each decimeter by which the length is reduced below 1 meter, and penalization on the same basis for dimensions in excess of these values; the cross sectional area is to be defined by the area of a circumscribed polygon having no re-entrant angles. The length is the total length including all accessories.

11. *Starting*

A bonus of 10 points will be granted to each power plant permitting of starting by the pilot from his seat without even a preliminary cranking of the propeller with the switch off.

Classification

The maximum probable number of points is 672. It is anticipated that the average figure will be 350. A special prize will be awarded to the engine of each class which secures the greatest number of points on condition that this total exceeds 350; this prize will be equal to 30,000 francs for the first class, 50,000 francs for the second, and 75,000 francs for the third.

A prize for each point above 350 will be awarded to every engine which qualifies for the fixed premium already described. This premium will be 250 francs per point for engines of the first class, 400 francs for the second and 500 francs for the third, which represents a maximum of 80,000 francs for the first class, 129,000 for the second, and 161,000 for the third.

Cancellation of Preliminary and Final Trials

The preliminary trial of 25 hours is to be cancelled if two of the 5 hour runs are cancelled. This trial may be restarted three times.

The final trial of 275 hours is cancelled if three 50 hour tests or two of the 50 hour tests and the final 25 hour run are cancelled. In every case where the cancellation of one of the tests is caused by a serious accident requiring the replacement of such essential parts as the crankcase, crankshaft or a connecting rod, the whole 275 hour trial will be cancelled. The prizes secured up to the time of cancellation remain held and cannot be annulled.

The builder may be authorized to submit a new engine for test with a delay of not over two months. The second engine cannot receive the same prizes acquired by the first submitted.

Appendices*

Details of Weight

The weight of the engine alone ready for flight includes the engine itself without fuel, with the maximum quantity of oil necessary for starting and running for a moment, this quantity of oil being taken as equal to the smallest quantity remaining in circulation at the end of any 5 hour test; this weight also includes the water contained in the jackets, the water pump, and the piping between the pump and the cylinders, and the accessories necessary for the operation of the engine. That is:

Carburetors, intake pipes for air and fuel, controls, and heating device, if any.
Magnetos or generator and batteries, with control, cable, and plugs.
Oil pumps with all the oil piping of the engine. Water pump with the piping between the pump and the engine. Pet cocks for draining the crankcase. Fuel feed system and its controlling means. Tachometer drive and drive for electric generator for general use on the aeroplane propeller hub with its bolts. Starter.

The weight of the propulsive unit includes besides the foregoing:

The engine bearers (the bearers themselves, bolts, fittings, etc.).
The controls of the carburetors and ignition switches.
The complete fuel feed unit (gravity tank, pipe, pet cocks, and fuel level indicator).
The pipe leading the air to the carburetor, the oil pipe between the tank and the pump, the quantity of oil which must be left in circulation, the oil pressure gauge and the pet cocks in the oil line.
The radiator with shutters, the piping, the cooling water in the radiator and in the pipes between the radiator and the engine, and the radio thermometer.
The tachometer.
The muffler.
The propeller.

The weight of the propulsive unit with 5 hours' fuel includes in addition to all the above the amount of fuel and oil required for 5 hours' flight at ground level at full throttle and at the speed N as already defined, an excess of 20% of oil being provided for safety, and the fuel and oil tanks necessary to hold these amounts.

Requirements for Safety and Structural Factors

Inertia Force

The attention of the engine builders is directed to the necessity of completely balancing the primary and secondary inertia forces.

Raw Materials

The raw materials used ought to be of a type easily obtained in industry; their stresses should not exceed the limits indicated below, the calculations of stress being made without allowing for inertia force, for the upper end of the stroke (F being the maximum explosion pressure at full throttle).

Connecting Rod

The limiting stress is to be 15 kg. per square mm. (21,000 lbs. per sq. in.) in compression with the factor of safety against buckling equal to 12, the buckling load being computed by Euler's formula for columns with pinned ends.

Crankshaft

The limiting stress is 15 kg. per square mm. for the crankpin calculated in bending as a straight beam having the section of the pin loaded at its central point and supported at the middle points of the two adjacent main bearings. The radius of the fillets where the crankpins join the crankarms is to be one-twelfth the diameter of the crankpin.

Piston Pin

Fifteen kg. per square mm. in bending and 8 kg. per square mm. (11,400 lbs. per sq. in.) in shear, the bending moment being given by the formula:

$$M = \frac{Fl}{8}$$

(l being the total length of the pin). The bearing pressure shall not exceed 1.7 kg. per square mm. (2,400 lbs per sq. in.) on the crankpin or 0.9 kg. per sq. mm. (1,270 lbs. per sq. in.) on the main bearings. The reducing gears ought to be stressed, under maximum torque, to not over 35 kg. per square mm. (50,000 lbs. per sq. in.), considering each tooth as a built-in cantilever loaded with a concentrated load at its outer end.

Ignition

Every engine must have double ignition—that is, two complete independent electric circuits, each firing one plug in each cylinder.

Lubrication

The lubrication must be so designed as to permit of operation for an indefinite period at an inclination of plus or minus 15°. It is recommended that a dry crankcase system be used with a pressure gauge and valve limiting the pressure.

Starting

The starting of the engine must be carried out without cranking of the propeller with the switch on; preliminary cranking with the switch off is permitted.

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*Translator's Note:—These appendices are very lengthy and deal largely with details of the manner in which drawings shall be submitted, etc. They have been abstracted to give only that material of interest to American readers.

Support

In the case where the motor is to be supported on bearers these must be straight and continuous over the whole length of the engine.

Tests of Materials Used

Tests on tension and impact tests will be made on all steels used. Complete parts will be submitted to Brinell test as a verification of their uniformity with the pieces tested. The resilience will be measured by impact tests for crankshaft, connecting rods and other members submitted to shocks.

Tests of Complete Members

Valve Springs

These will be tested for dimensions at rest and for a deformation under a weight later to be determined.

Non-Porosity of Cylinders and Piston

The impermeability of cylinders and pistons will be tested by hydraulic pressure of 30 kg. per square cm. (420 lbs. per sq. in.) applied for a period of 5 minutes.

Impermeability of Water Jackets

The staunchness of the water jackets will be tested under a pressure of 2 kg. per square cm. (28 lbs. per sq. in.) for 5 minutes.

Oil Pump

The curve of flow of oil at N r.p.m. of the motor will be established with a valve the resistance to flow and pressure on the outlet side of the pump.

Water Pump

The curve of water flow will be established in the same way as for oil, the head at the outlet varying between 0 and 10 meters of water, the water being drawn up by the pump from a tank 1 meter below the center of the pump.

Oil Circulation

The oil line should be completely tight and show no leakage under an internal pressure of double the normal pressure of operation.

Control of Trials

The bench tests of the engines will be carried out on a cradle dynamometer with a fan brake, on a hydraulic dynamometer, or with an electrical dynamometer. The starting of the engine when cold must be accomplished without cranking the propeller, in not over 5 minutes, no matter what the atmospheric conditions may be. After starting the engine at the time fixed by the Commission the beginning of each test will be counted as the instant chosen by the entrant when the engine, all its controls having been set for continuous running, shall have attained a steady condition of operation. Starting from this moment the engine ought to be considered as being on an airplane in flight and ought not to receive any attention which cannot be given in flight; any adjustment in fulfilling this condition will be considered as a stop of the engine.

The engine ought to be free from vibrations which would endanger the solidity of the airplane or the setting of the controls of the engine. The head of fuel above the constant lever in the float chamber will be not over .75 meter. The temperature of the cooling water will be maintained at 60° on entering the cylinders and 70° on leaving. In no case may special fuels not obtainable on the ordinary market be used. The test results will be corrected to a pressure of 760 mm. of mercury on the assumption that the torque is directly proportional to barometric pressure, and the tests will be conducted at a temperature of 15° centigrade.

Tests

Each section of the endurance trial will consist of:

- A preliminary 30 minutes at full throttle.
- An intermediate period at 80% of the power obtained in the second quarter of an hour of the full throttle run.
- A final 2 minutes at full throttle.

The torque and speed will be observed every 10 minutes. The measurements of speed will be made by means of a revolution counter connected directly to the motor and also with a direct reading tachometer.

During each part of the trial variations in torque and in speed must not exceed 5%. As soon as a greater decrease of power is observed it must be remedied. At all speeds the firing must be regular without explosions in the exhaust pipe. The acceleration ought to be accomplished without backfiring in the carburetor. The progressive opening in the throttle ought to cause a continuous and steady increase of the engine power (with a propeller or fan brake). Every trial will be cancelled in case of breakage or serious deterioration of an important part of the motor itself.

Preliminary Trials

The curve of power determined with a fan brake and with variable throttle setting permits the determination of the steadiness of respect to the throttle. The powers and speeds obtained will be plotted as ordinates against the throttle opening as abscissae.

The curve secured should not show any local minima before the peak corresponding to the maximum power—that is to say, there should be no "dead spot" in the carburetor. The power curve at full throttle will be established by 6 points with a series of fan brakes giving speeds approximately equal to N + 50, N + 100, N + 200, N — 50, N — 100, and N — 200. Each measurement will be repeated three times. The test at an inclination of 15° may be carried out with a calibrated fan brake instead of the dynamometer.

After the first 25 hour run the engine will be weighed, and its weight must not be more than 2% different from the initial weight. It will then be torn down and examined. All parts must be in good condition and show no trace of abnormal wear, deformation or scarring. In particular the cylinders must have a clean surface, the exhaust valves must not be pitted and must rest evenly on their seats; teeth of the gears must show no eccentricity nor signs of seizure, and ball bearings must not have any abnormal play.

Parts seeming to be defective will be replaced. If important parts are thus changed, the Commission will require from the engine an extra 5 hour run, carried out in the same conditions as the first one and followed by a new examination.

Trial of Verification

In case the builder does not wish to attempt the 275 hour endurance run after the reassembly which follows the examination, the engine will have to make a 20 minute run before being released. This run is to ensure that the reassembling and adjustment after dismounting is correct. It will include a verification of 1 point on the power curve at full throttle.

275 Hour Endurance Test

Two 5 hour runs will be made each day until completion of each of the 50 hour groups. The two will be separated by stop of one hour. The 10 hour run of each 50 hour group will be made not more than 13 hours after the last 5 hour run. Between each two 50 hour groups and before the final 25 hour test the builder will be granted 24 hours for overhauling the engine. After two consecutive 5 hour runs separated by one hour stop there will be a 13 hour interval before the next run. During the one hour stops the engine must receive only the usual attention to magnetos, carburetors and plugs.

The lubrication of external parts is also permitted during this 1 hour stop.

During the 13 hour and 24 hour stops cleaning, examination and such changes as could be carried out on an aeroplane in a hangar without removing the engine from the aeroplane are permitted (tightening of bolts and screws, changing of plugs, etc.). All the operations carried out will be recorded and will be taken into account in the report on the engine. The number and duration of the stops will be reduced if requested by the constructor. All tests and all disassemblies and reassemblies must be carried out in the presence of a representative of the Commission, who will lock up the engine whenever he is absent.

Annulment of Tests

A 5 hour run will be annulled and must be restarted if any stop occurs during the first three hours or any stop of duration greater than 15 minutes at any time, or if two stops occur during the last two hours of the test. A 10 hour test will be annulled if any stop occurs during the first four hours or one lasting over 15 minutes happens at any time or if there are three stops during the last six hours. The 25 hour run will be cancelled if there is any stop during the first five hours or any stop in excess of 15 minutes at any time, or if four stops occur during the last twenty hours or if there is any breakage requiring important repairs (crankshaft, connecting rods, camshaft, etc.).* A 50 hour trial will be cancelled if any important part is broken or if four of the 5 hour trials or two of the 5 hour trials and one 10 hour trial which go to make it up are cancelled. The cancellation of three 5 hour trials will cancel the 50 hour group to which they belong if all three are caused by the breakage of the same part.

Installation of the Engine for Bench Test

The test will be made with a cradle dynamometer when possible. The exhaust pipe must be arranged so that the reaction of the exhaust gas will not add to the torque. The fuel piping will include a pet cock with graduated bottle placed at the same level as the fuel tank in order to permit of the measurement of time to consume one liter of fuel for motors of the first class and two liters for those of the other two classes.

A water manometer will be used to give the suction in the pipe from each carburetor.

The cooling of the crankcase by means of a stream of water will be permitted in order to keep the oil temperature below 80° centigrade.

The installation of the water circulation system must permit the measurement of flow from the pump at different engine speeds and with the resistance in the circuit varying. he resistances will be determined by two manometers placed on the intake and outlet sides of the pump.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(Continued from last week)

Mr. Blodgett's timber tract, 23 miles south of Yaquina Bay, contained 250,000,000 feet of spruce and some other timber—in all about 670,000,000 feet (p. 1894), or only a small fraction of spruce and fir compared with the Siletz tract. At Col. Disque's request Mr. Blodgett traveled to Portland, Ore., to see him. Col. Disque there insisted that Mr. Blodgett must dispose of his spruce timber for $1.50 per thousand. Mr. Blodgett refused to consider the proposition, because of existing destructive "selective" methods of logging, the fire risk and low price.

On May 3, 1918, Mr. Blodgett wrote to Col. Disque that he did not want to sell his tract, but would dispose of it for $635,000, or less than $1 a thousand for all stumpage. Later on the same day Maj. Hitchcock wrote to Mr. Blodgett requesting him to call again at headquarters. Mr. Blodgett did so and Maj. Hitchcock then demanded that Mr. Blodgett sell his tract for $450,000 to a party to be named by Maj. Hitchcock. Upon Mr. Blodgett's refusal, Maj. Hitchcock questioned Mr. Blodgett's motive and patriotism and declared that the timber would be commandeered at the lowest possible price. That closed the interview.

Disque Promises to Commandeer

On May 6 Maj. Stearns (chief of staff) wrote to Mr. Blodgett that Col. Disque was issuing a "commandeer" order on his spruce timber at $1.50 per thousand. Mr. Blodgett did not reply.

June 10 Col. Disque wrote to Mr. Blodgett saying that he prefererd "not to exercise" the Government right to commandeer. Col. Disque again offered $1.50 per thousand for all spruce taken. At this time Col. Disque had fixed a price of $7.50 per thousand for other selected spruce, according to statement of Mr. Blodgett.

Mr. Blodgett submitted a letter to the committee, dated June 22, in which he offered to pay Col. Disque "double the price you offer for any tract of like quantity and quality."

August 19 Col. Disque wired Mr. Blodgett offering to pay $3 per thousand—"a fair price for your spruce." Mr. Blodgett refused, because of the waste of timber caused by "selective" logging and the fire risk.

Four days later, August 23, Col. Disque wired Mr. Blodgett: "I will pay you $635,000 for your entire Alsea Bay tract as per your letter of May 3."

Mr. Blodgett's attorney replied that he "preferred to keep this property as an investment, and he sells it entirely for the purpose of promoting the war interests of the Government. If peace is as near as it is thought to be by many, he would much prefer to keep the property."

The foregoing record is not entered in the hearings, but is found in correspondence filed as "Exhibit A," committee hearings, December 18, 1919.

The Warren Spruce Co. was given orders by Maj. Hitchcock on April 8, 1918, before any negotiations were had with Mr. Blodgett, to build a 23-mile railroad from Yaquina Bay to the Blodgett tract.

Nearly $3,000,000 Paid for a Useless Railroad and Sawmill

The road had not been completed when the armistice was signed, while the Blodgett deal was not closed until December 2, 1918, or nearly one month after the signing of the armistice. This timber tract, bought by Col. Disque, was to give value to a worthless $2,000,000 railroad, and it is significant that this railroad has not yet been sold by the Government, although given by the Spruce Production Corporation officials a salvage value of less than 8 per cent. This road also was blocked by slides when examined by your committee in September, 1919.

Charges were made of attempted official graft, based on trying to force Mr. Blodgett to sell for $450,000. No testimony to that end was presented to the committee.

The Government is out $2,000,000 on this railroad and has also paid $635,000 for the Blodgett timber tract.

In keeping with the general extravagance evidenced throughout the spruce production operations, an item of $821,825 (p. 2857) for a sawmill at Toledo, built by Col. Disque, at governmental expense, is noted. The building of this mill was condemned by the Government logging engineers (Ray report, Forester's letter to Disque) and by nearly every practical millman who testified before the committee. Small mills to saw cants were available and others could have been built at a moderate cost; but the Toledo mill was a "white elephant," equal in character to the Siems-Carey-H. S. Kerbaugh mills—monuments of reckless waste and expenditure of public funds.

Among the 13 "logging roads" built by cost-plus contractors, another deserves brief mention in this report. It is known as the Siems-Carey $4,000,000 "logging" road with which the name of Director John D. Ryan was first connected by Lieut. Kerrigan and Maj. Howes of the Intelligence Bureau of the Army.

Hearings were begun on the coast on August 20, prior to which time the committee personally inspected the Siems-Carey railroad, the Siems-Carey sawmill at Port Angeles, built by the Government, and also made an examination of conditions at Clallam Bay, Pysht Bay, Pleasant Lake and other points covered by matters in controversy.

Request Made of Former Aircraft Director Ryan to Explain Important Evidence

Interrogation of witnesses during committee hearings and reaching nearly 4,000 printed pages, was undertaken almost entirely by different members of the committee, excepting at the New York hearings, which were conducted by Mr. Steinbrink, the able counsel for the committee, whose advice and aid have been of great value.

In addition to his testimony, Mr. Ryan requested permission of the committee in New York to file an explanation of his own acts in connection with the letting of contracts and building of railroads and mills by the Siems-Carey Corporation. This privilege was granted. Mr. Steinbrink, the committee counsel, then made the following specific request in reference to matters that ought to be explained by Mr. Ryan in justice to himself (p. 3127):

> Mr. Steinbrink. Mr. Ryan, may I say to you—and I feel, in view of this discussion I should say it in justice to myself, since the press are here—that I have no interest in this matter, except to develop the fact, and it is wholly immaterial to me whom it helps or hurts. This record was submitted to me prior to my beginning your examination. These facts, to my mind, stand out, and I am going to call your attention to them, Mr. Ryan, that on April 8, 1918, as the record discloses, Col. Disque decided in favor of the Deep Creek, or rather was not impressed with the route as finally built; that on April 12 the first spruce contract was entered into, the so-called Portland or preliminary contract; that about April 24 you came into the Government work; and that on April 26 Judge Lovett's letter was written with respect to this railroad; that on May 12 the spruce contract was entered into, approved some time later, but dated on that date——
>
> Mr. Ryan. May 28, approved.

(To be continued)

NAVAL and MILITARY AERONAUTICS

Army Officers Strongly Endorse J-L-6

Washington,—Army officials have expressed the opinion that the Larsen J-L-6 all-metal monoplane, which has been undergoing tests at Bolling Field, Washington, opens a new era in aviation. Colonel W. K. Wilson, of the General Staff, after making two test trips in the new monoplane, said:

"At the invitation of J. H. Larsen I made a trip on June 10 in one of Mr. Larsen's J-L-6 all-metal monoplanes from Bolling Field, Washington, to Langley Field, near Hampton, Va., and returned on the same date. The distance covered in the round trip was approximately 270 miles. The plane was driven by L. C. Eaton. Including the pilot, there were five passengers. The trip down was made in 95 minutes and the return trip was made in 100 minutes, although there was a strong head wind working against us.

"On the next day I rode in the same plane with the same pilot, from Washington to Central Park, L. I., a distance of approximately 250 miles in 145 minutes. Including the pilot, there were six passengers and hand baggage.

"The J-L-6 represents a new era in aviation. It is designed to secure the maximum safety, service and efficiency. The metal wings carry the gasoline tanks which have a capacity sufficient to keep the plane in the air for more than ten hours. However, consumption of gasoline for a plane of this size is very low. The cabin is designed for the comfort of the passengers. There are four upholstered seats arranged similarly to the seats in a limousine. There is a door on each side of the cabin and isinglass windows which can be raised or lowered by the passengers.

"Behind the cabin there is a small compartment for baggage. During the flight the passengers changed seats at will, ate lunch and wrote letters. As an inspection plane for army officials, the J-L-6 is ideal. The metal construction has a big advantage in that it is both fireproof and weatherproof and the possibility of developing this type into a very much larger plane with greatly increased carrying capacity makes its introduction very important to both commercial and military aviation."

Army Aviators to Fly to Alaska

Five army aviators will leave Mitchel Field, near Mineola, L. I., July 10 in four specially constructed aeroplanes, bound for Nome, Alaska, 4,871 miles away. Their purpose is to lay out an air route for commercial purposes. They will make twenty-two stopc to examine and map sites said to be suitable for landing places.

When the route has been laid out the trip can be made in eight days, it is said. For the experimental trip forty-five days will be allowed for the slowest machine, including all stops and repairs. Ten days will be spent at Nome, and new engines will be installed in the aeroplanes for the return trip.

The machines to be used are De Haviland 4-B in type. Work on the aeroplanes is said to be almost completed. They are being built at East Greenwich, R. I.

Captain St. Clair Street will be commander of the flotilla and will pilot one of the planes. The officers accompanying him will be Lieutenants Erik H. Nelson, Clifford C. Nutt, A. C. Kirkpatrick and Clarence Krumerine.

Army Permits Navy to Use Mitchel Field

The Secretary of War has granted permission for the use of Mitchel Field, Long Island, by a Navy aviation detachment for training personnel for shipboard work.

Captain Craven Inspects Air Station

Capt. T. T. Craven, Director of Naval Aeronautics, has returned to Washington from making an inspection of the Langley Air Station, Hampton Roads, Va., the aviation storehouse, the fleet air detachment, Yorktown, and Langley Field. He also attended the opening of the Langley memorial wind tunnel.

Major Culver Honored

During the commencement exercises at the University of Nebraska this past week, the honorary degree of Electrical Engineer was conferred upon Major Clarence C. Culver, Air Service in recognition of his work in wireless as applied in aviation and of his Military record since leaving the university in 1898, for service in the Spanish-American War.

Army Flying for Reserve Officer Aviators

In order that the advantages gained by our War experience may not be lost the Army has arranged that qualified aviators now holding commissions in the Officers Reserve Corps may continue their flying training. In following out this policy certain fields have been designated as Active Flying Fields and at these places Reserve Officers may make flights by communicating with the Commanding Officer of the field and arranging for the time when planes will be available and the military activities will permit of their use.

In order to avail himself of this opportunity for keeping in touch with the Air Game, the Reserve Officer must obtain an identification book from the Director of Army Air Service, Washington, D. C. Whether or not advantage is taken of this offer is entirely voluntary with the aviators.

It is intended that from time to time the Army will arrange for flying competitions which the reserve aviators may enter if they so desire, and thus have an opportunity to demonstrate in performance tests their air proficiency.

Fields where this policy is now in operation are: Carlstrom Field, Arcadia, Fla.; Kelly Field, San Antonio, Texas; Langley Field, Hampton, Va.; March Field, Riverside, Cal.; Mather Field, Sacramento, Cal.; Mitchel Field, Mineola, L. I.; Post Field, Port Sill, Okla.; Bolling Field, Washington, D. C.

Armament for Aircraft Recommended

Col. Thomas D. Milling, Air Service; Lieut. Cols. Harry J. Malony and Lee O. Wright, Ord. Dept.; and Lieut. Col. Harold E Hartney and Capts.. Alfred D. Hobley, Harry A. Sutton and Burdette S. Wright, Air Service, constituting a board to consider the development of aircraft cannon and machine guns, have filed their reports, accompanied by recommendations.

Five Thousand in Reserve

The Air Service has now more than six times as many emergency officers in the reserve as it has on active duty. There are more than 5 times as many flyers and nearly 9 times as many non-flyers in the reserve as in active service. Of the total number of emergency officers commissioned during the war, 6 per cent remain on active duty, less than one-half of one per cent are assigned to other branches of service and 37 per cent have been recommissioned in the reserve.

Lieut. John H. Wilson, on right, ready for his record parachute jump of 19,800 feet at Kelly Field, Texas. Lt. Dunton, pilot, standing on left and the D.H. plane from which Lt. Wilson dropped

FOREIGN NEWS

The London-Amsterdam Air Service

The first regular Air Service between England and Holland started recently when two Airco machines left Croydon for Amsterdam. Machines will leave London on Mondays, Wednesdays and Fridays, and return on Tuesdays, Thursdays and Saturdays. The aerodrome in Holland is 20 minutes by car from Amsterdam.

From England the following time-table is to be worked to:—London (Croydon), dep., 10 A. M.; Amsterdam, arr. 12:45 P. M. Train connections permit of arrival at The Hague at 3:05 P. M. and at Rotterdam at 3:21 P. M.

The journey is one of considerable interest, as the route followed is Folkestone, Calais, Dunkirk, Nieuport, Ostend, Zeebrugge, The Hague, Amsterdam, and passengers get a wonderful survey of the Belgian battlefields between Dunkirk and Ostend, the complete devastation of the country and the terrible effect of heavy gunfire being brought out vividly. North of Ostend batteries of heavy German guns in their emplacements can be clearly seen pointing to the sea, and a view is obtained of the *Vindictive* lying across the canal mouth of Zeebrugge.

The machines used are of the same type as those operating the two srvices daily between London and Paris, the famous Airco 16 four-passenger limousine aeroplanes.

Special arrangements have been made for the rapid conveyance of goods, and all parcels leaving in the 10 A. M. machine consigned to Amsterdam, Rotterdam or The Hague, will be delivered during the same day.

The charge per passenger is 15 guineas single, and *2s. 6d.* per lb. for small consignments of goods down to *1s. 6d.* per lb. for larger loads.

The "Daily Express" £10,000 Indian Flight

It had been intended that the Handley Page-Napier, piloted by Major A. Stuart Maclaren, should have started from Croydon for India, but, owing to the unsettled state of affairs in Arabia, the Air Ministry put a ban on flying east of Cairo. Two entrants now await official permission to start, Major Maclaren on the Handley Page-Napier, Old Carthusian II, who will have Capt. J. A. Barton with him as navigator, and Mr. R. W. Kenworthy on the Blackburn Kangaroo-Rolls-Royce, who will have Capt. G. H. Wilkins as navigator.

The Olympia Show Next Month

The Secretary and Under-Secretary of State for Air and the Air Council have consented to become patrons to the Aero Exhibition, which will be held at Olympia from July 9 to July 20.

Fights on Palestine Border

A semi-official account of the disturbances on the Syrian-Palestinian border states that on May 7 a British aeroplane was compelled to land east of Lake Tiberias. The machine was burnt by the Arabs, but the officers were sent back to Semakh unhurt.

Many Planes at Resorts in France

The French Civil Aviation Department estimates that with the summer resort business there will be at least 500 machines in the air per diem from May to the end of September, and of the privately owned machines there will be about a hundred in service, chiefly small machines, such as Farman "Davids," H. Potez "Type VIII," Caudron G-3 (with ailerons), and Besson triplane flying boats.

Average 109.89 Miles Per Hour on Flight in South Africa

The British Ignition Apparatus Association send us the following item of news: "News comes by cable that an average speed of 109.89 miles per hour was maintained in the 1,000-mile flight by Lieut. Holthouse and Lieut. Debeer between Cape Town and Pretoria, which was accomplished in 9 hours 6 minutes. This speaks well for the efficiency of British magnetos and the British engine, which forms the propelling unit of the South African Government aeroplane 'Vortreker,' which was used for the flight."

Aerial Mail Services in French Indo-China

The aerial mail service now being organized in Indo-China will comprise 30 aeroplanes of the Bréguet type and will cover all towns from Hanoi to Haiphong, to Nam-Dinh and to Thaihguven.

Increase Aerial Tourist Lines in France

The Transaeriennes Co., in addition to the Paris-London line, intend operating Paris-Lyons-Marseilles and Paris-Strasbourg, together with daily trips to various points on the old battlefields, using both aeroplanes and airships. This latter work is being done in connection with Thomas Cook and Son and the American Express Co.

Messageries Aeriennes Increase Lines

The Messageries Aeriennes expect to have a minimum of 50 machines in the air per diem on regular transport lines this summer. The Paris-Lille-Brussels line will probably have an alternate day extension to Amsterdam and Cologne to link up with Scandinavian and German lines. There will be another line into Switzerland branching from Lyons and one into Italy from Marseilles, also possibly one from Marseilles to Toulouse to link up with the Bordeaux and Morocco lines which are now in operation. The Paris-Cabourg-Trouville line will reopen as soon as the season commences.

The Handley Page New Wing

The Marquess of Londonderry, Under-Secretary of State for Air, Major General Sir Frederick H. Sykes, Controller General of Civil Aviation, General E. D. Swinton and Monsieur Flandin, the French Air Minister, witnessed recently at the Cricklewood Aerodrome a flight by an aeroplane fitted with the new Handley Page wing.

To Golf Links by Air at Scotch Tournament

Glasgow,—Aeroplanes on regular schedule carried people from here, forty-seven miles, to the big professional tournament at Gleneagle, Perthshire, beginning May 24.

Aero Service Between Australia and New Zealand

The Australasian Aerial Transport Company will shortly be registered at Melbourne, with a capital of £700,000, to establish passenger, cargo, and mail services between Australia and New Zealand.

New Zealand is separated from Australia by 1,200 miles of water, and this distance could be covered in a single flight of from twelve to fifteen hours.

Two main obstacles stand in the way of a New Zealander attempting this flight. The first is the high cost of the venture, and the second is the lack of official backing. The big flights recently made, such as the Transatlantic flight and the flight to Australia, were financed by companies engaged in the manufacture of aeroplanes. No company has yet extended its interest to the crossing of the Tasman Sea, although, as the cable quoted above shows, one is in process of being formed to undertake the flight.

Flies to Bull Ring

Madrid.—Some bullfights at Palma, Island of Majorca, have attracted enormous interest recently because Luis Freg, the Mexican fighter, arrived at the ring by aeroplane, having missed the steamer which was to have brought him from Barcelona.

After a fifty minute flight across the Mediterranean, Freg arrived at Palma in time to take his turn in the arena.

Prepares to Attain 7½-Mile Height

Paris,—Shut in an air-tight bell, Jean Casale, a French airman, who holds the height record of 9,520 meters, has been experimenting with an oxygen-breathing apparatus which he hopes will enable him to fly seven and a half miles above the earth. When he made his height record he used electrified clothing to keep him warm, but the effect of the rarified air compelled him to come down sooner than he had intended.

At 8,000 meters he found it difficult to raise his arms. When he moved them to control his machine it seemed like lifting a hundred pounds. Higher up he became completely indifferent to everything and felt that death and life meant nothing.

His experience convinced him that if he could get enough oxygen to breathe there was no reason why he should not reach a height of 12,000 meters, at which his engines would still function.

In order to discover how best to arrange an effective breathing apparatus the Aerotechnic Institute at St. Cyr had an air-tight bell set up from which the air could be gradually exhausted. The aviator took his seat inside with a barometer in his hand which showed the rate of air exhaustion and so of the height theoretically reached.

Two tanks of compressed oxygen were also placed inside and the aviator was fitted with a mask hrough which to breathe. In the wall of the bell were two windows through which those outside could see if he made any signs. When the air pressure inside the bell reached the equivalent of that at 4,000 meters Casale began to use oxygen. At the equivalent of 6,000 meters he felt cold and increased the oxygen doses. At 9,000 he signaled that everything was going well, but those outside noticed that he moved his hands slowly as if his muscles did not respond to his will—recalling his experience when actually flying at that height. At 11,000 meters he was seen to close his eyes as if overcome by the rarefied atmosphere in which he was sitting.

When the barometer showed that he was in an atmosphere corresponding to that at 12,000 meters' altitude he signaled to begin pumping in air again, and when he was released he declared that he was perfectly satisfied with the experiment and hoped soon with the same apparatus to attempt a flight at a height of 12,000 meters.

Flies from Paris to Warsaw

Paris,—Lieutenant Henri Roget, the French aviator, who left Paris on an "around Europe" flight, arrived at Warsaw.

The next leg of Lieutenant Roget's flight is to Bucharest, after which he will attempt to fly to Constantinople, Athens, Rome and then back to Paris.

American Aviators with Poles Sink Red Monitor

Warsaw.—On June 3rd the Poles launched a counter attack south of Kief, in the Ros River region, where the reds have concentrated in an endeavor to drive to the northwest in order to compel the Poles to evacuate Kief.

The bolshevik forces captured some ground, but the official communique announces that they were thrown back and several villages recovered. The fighting continued, the bolshevik infantry, aided by a flotilla, trying to cut the Polish communication leading to Kief along the Dnieper until attacked by the Kosciusko aviators, who used machine guns and bombs. One monitor was sunk.

French Establish Aeronautical Custom House

Paris.—The world's first aeronautical customs house has been established by the French government at St. Inglevert, six miles from Calais.

A permanent staff of special customs officials familiar with aeroplane construction and qualified to search aeroplanes has been installed. Aviators have been notified that upon entering France they must land at St. Inglevert and pass customs inspection.

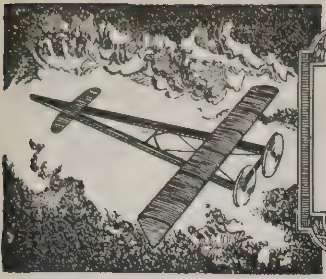
In event of difficulty in descending, or in special cases, the government will overlook noncompliance with the requirements, providing the aviator reports his dereliction to the customs authorities at Dunkirk, Calais, Boulogne, Letreport, Dieppe, Havre, Caen, Cherbourg or St. Milo. Licenses of pilots disobeying the new regulations will be revoked.

Whether special customs squadrons of aircraft will be created for the purpose of chasing and arresting aviators who refuse to recognize the authority of the earthbound officials is under discussion.

Big New British Airship Soon Ready

Barrow, England,—Airship R-80, built here for the Admiralty, will be launched in two or three weeks. She embodies the latest improvements in aircraft design, and it is stated could fly across the Atlantic with ease.

The vessel is 535 feet in length and 70 feet wide. Her lifting power is 38 tons. Four engines, each of 240 horse power, will give her a maximum speed of 65 miles an hour. She will carry a crew of fifteen. Originally intended for war purposes, the gun platforms and fighting paraphernalia have been discarded that more accommodation may be provided for passengers. She may be used to carry tourists over the battlefields of France and Flanders.



ELEMENTARY AERONAUTICS

and MODEL NOTES

By John F. McMahon

CLUBS

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921 Ravenna Boulevard, Seattle, Wash.
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Steam Engines

Steam engines in this case refer to the type used in Model Aeroplanes. Some well designed plants have been used to propel high-speed model boats in races. They work out well in this case because weight makes little or no difference to a certain extent and little danger in case of fire.

In the model aeroplane it is different. Every fraction of an ounce must be accounted for and care must be taken to keep the fire away from the model because of the doped wings which are highly inflammable.

Few successful steam plants have been designed for model aeroplanes, the English have done the most experimenting along these lines and have had fair results. Prop. Langley developed a plant that he used in his first successful working model. It took him months of careful study and work to get it perfected however, and it was a wonderful invention.

A Steam Engine functions much the same as a compressed air motor. In the latter case a cylinder is constructed of Sheet Bronze wrapped with Piano Wire every ⅛-inch for strength. Two caps soldered to the ends complete this cylinder which is generally 18 inches long and 3 inches in diameter. This cylinder is the tank into which air is pumped by an ordinary foot pump and compressed until the pressure equals 125 lbs. to the square inch. A pipe runs from this tank to the motor. When the valve is opened the compressed air runs through this pipe and into a valve in the engine, which revolves with the crank-shaft and allows air to enter each cylinder as the piston reaches the highest point, when the pressure causes it to move down to its lowest point when it is shut off and the other, or following cylinders are opened up. This continues on as long as there is air left in the container.

Now a steam plant is the same only instead of a tank of air it has a steam boiler which feeds steam to the cylinders exactly like the compressed air motor.

This steam boiler is made of a spiral of Steel or Copper tubing ⅛" inside diameter and is about 10" long. It is wound around a former 1" in diameter at spaces of ½" between centers. This will require about 5 feet of tubing. Steel should be used where it can be obtained because of the strength.

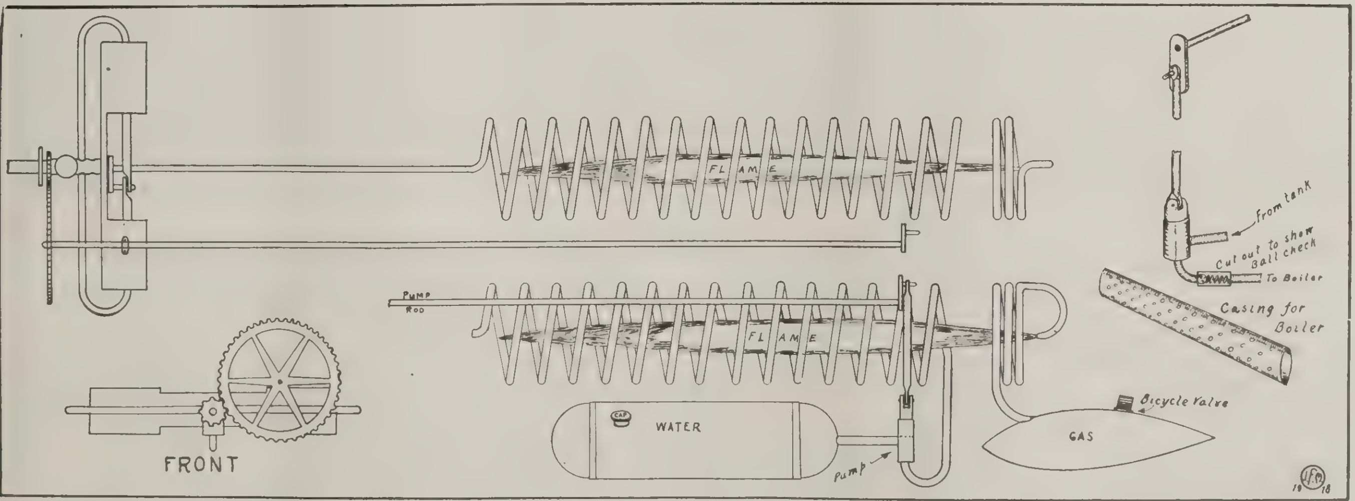
This type of boiler is known as the flash type. A flame much the same as the flame of a blow torch, is projected through the coils which makes steam almost instantly. The torch is composed of coils of tubing, three are required and these are wound close. The tubing leads from a gasoline tank, (to hold about ¼ pint) where pressure is pumped in to give it force, and leads up and around the flame end. The flame end is closed slightly to allow a small hole for the vaporized gas to pass through and ignite. The gas is vaporized in passing through the tubes around the flame. This flame has an extremely high temperature and the point of the flame is the hottest point.

Water must be fed to the boiler as fast as it is used in generating steam, so a force pump is made to operate from the revolving crank-shaft, which has a small pinion fastened to it which in turn drives a large spur gear that works the pump. This pump must be made in such a way that the stroke can be lengthened or shortened to regulate the boiler feed. Should the pump feed too much water the boiler will not heat up and the engine will not have its maximum power, on the other hand if it does not feed enough it will allow the boiler to run dry and no steam can be generated. The water tank should hold about ½ pint and no pressure need be pumped into this tank. The feed pump will take care of this, and it should be fastened close to this tank.

All the soldering of the engine and connections should be silver soldered because if ordinary solder is used it will be melted by the high temperatures encountered.

A frame for the plant should be constructed first because it must have a rigid bed, an aeroplane model would not be strong enough at the point where it is fastened in unless made of oversize parts that would make the model extremely heavy.

Take care that a covering of asbestos paper or sheet metal is placed around the boiler coils to keep the machine safe from possible fire.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Some Impression

Fair visitor: "What impressed you most during the war?"
Army aviator: "The number of shells that missed me."

A Deserving Fate

Prohibitionist: "I think all these exbartenders should be put behind the bars."
Pilot: "Just so, just so."

On the Trans-Atlantic Airship

Steward (on airship): "Your lunch will be up in a minute, sir."
Tourist (passionately embracing the rail): "So will my breakfast."—*Medley.*

Fall Out!

Battalion commander: "Now that you have the battalion facing south, how would you get it into line—companies front facing north?"
Flying cadet: "That's just what I've been thinking ever since I got them facing south."

His Luck

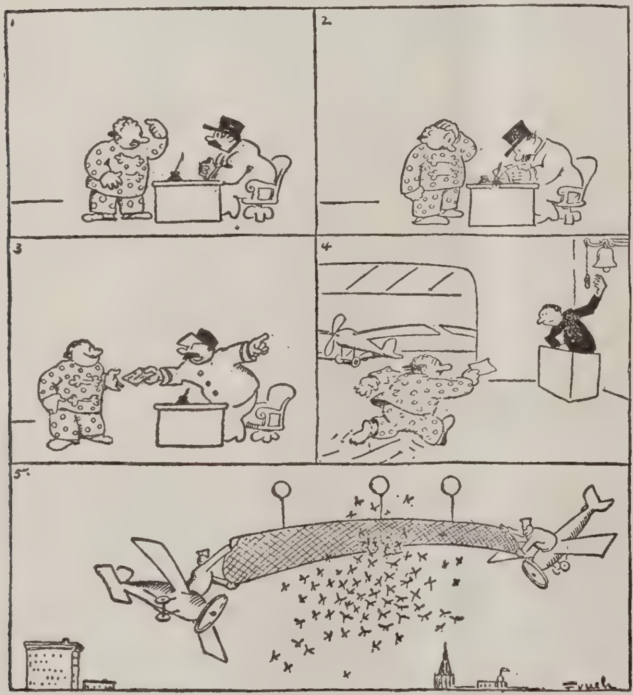
The unlucky Tommy in Russia was telling his troubles to a sympathetic friend.

"No leave, no letters, no blinking Blightly, no luck at all!"

"Never mind, you'll soon be dead."

"Yes," said the unlucky one, "and if I was dead now, and on my way to Heaven, I'll bet I'd be brought down by an anti-aircraft!"—*American Legion Weekly.*

MAYOR HYLAN'S SKY COPS



Courtesy N. Y. World

1917—The Flying Cadet—1919

There was a time so people say,—
It's vouched for by an officer,—
When a flying cadet was the hero of the day
And received a hundred dollars per.

His headgear was a barracks cap,
Leather adorned his lower limbs,
For work he didn't give a rap,
And he strutted about like Admiral Simms.

It took this gent eight weeks at school
And four afield to learn to fly,—
First lieut's bars and iron-bound rule,—
All over and never a sigh!

The modern cadet in a different species;
At that he's a regular guy,
He beats his brother all to pieces,
And has the same desire to fly.

They kick him about from place to place,
For a joy-stick he gets a broom;
The C. O. strikes him a blow in the face
And tells him to sweep the room.

He asks for a plane with which to play,
They always give him this reply,
"To-morrow, baby, not to-day,
Work and do not cry."

At night he dreams he's in the air,
Floppin' a pair o' wings,
A birdie wakes him with song so fair,
And teases and dances and sings.

Yes, a wonderful thing is a flying cadet!
But if he were needed again by the nation—
He's not a quitter you can bet—
He'd go right back to the aviation.

E. E. G.

Take Heed, Oh Fair Sex

Aviator's son: "Father, what is innocence?"
Aviator: "Innocence, my son, is a woman who believes that her husband likes cloves."—*Burr.*

Among the Missing

The girl: "You make me think of Venus de Milo."
Aviator: "But I have arms."
The girl: "Oh! Have you?"—*Voo Doo.*

Give 'em Air

"Your pianist reminds me of an aviator."
"How's that?"
"He's doing his best to conquer the air."

Correct

Teacher (at the U. S. Army Aviation School): "Where is Detroit?"
Cadet (becoming Americanized): "In last place!"—*Army Recruiting News.*

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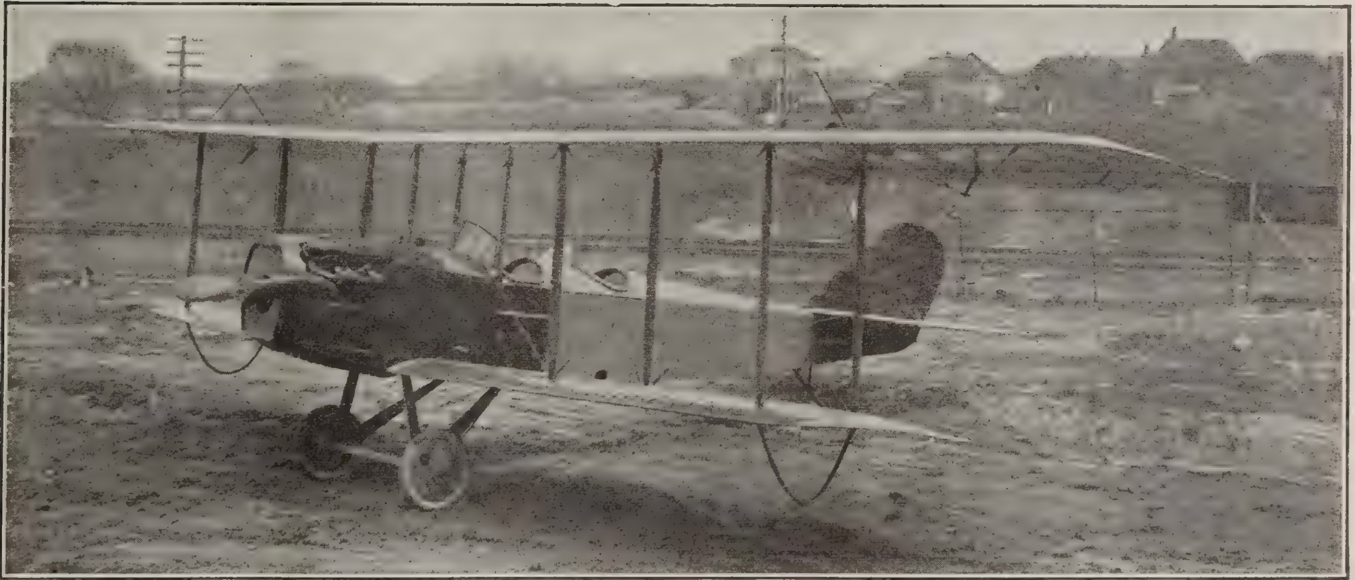

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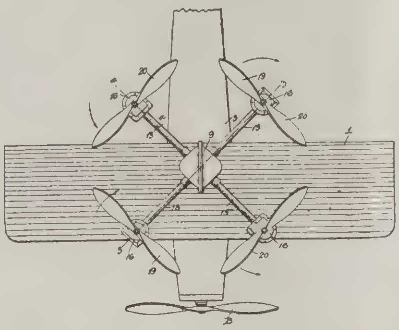
Northwest Aircraft Corporation, Newell, S. D., for Western South Dakota.

Erick Aviation Company, Erick, Okla., for Western Oklahoma and Pan Handle.

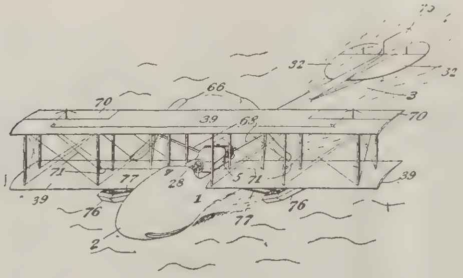
RECENT AERO PATENTS

1,298,724. AEROPLANE-PROPELLING DEVICE. Nelson Leslie Hyatt and Harvey Lloyd, Dresden, Ontario, Canada. Filed Dec. 10, 1917. Serial No. 206,526. 2 Claims. (Cl. 244—15.)



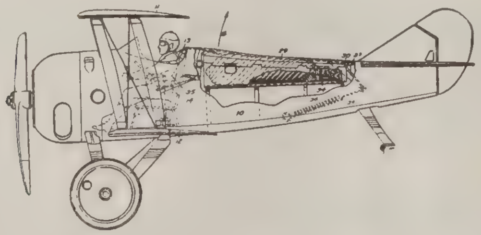
1. The combination with an aeroplane embodying a fuselage, a motor, and aerofoils, of a standard supported on the fuselage and extending upwardly therefrom, a plurality of shafts radiating from said standard above the uppermost aerofoil, a helicopter propeller arranged near the outer end of each shaft, means for rotating said propellers from said motor, said means arranged to rotate the diametrically opposed pairs of propellers in the same direction and the propellers of the pairs upon each side of the longitudinal axis of the aeroplane in opposite directions to maintain lateral stability of the aeroplane and impart an ascensional effort thereto.

1,312,910. AEROPLANE STRUCTURE. Albert S. Janin, New York, N. Y., assignor, by mesne assignments, to The Janin Co., Inc., New York, N. Y., a Corporation of New York. Filed July 31, 1913. Serial No. 782,225. 53 Claims. (Cl. 244—2.)



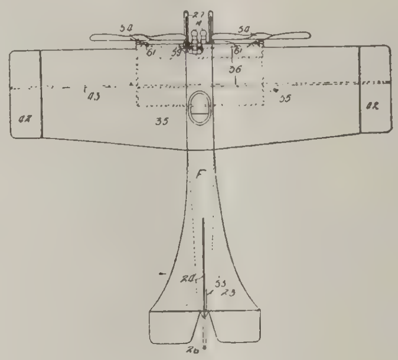
1. A device of the character described having a buoyant hull-like body portion adapted to traverse the water, and except for the aeroplane lift adapted to be substantially the entire supporting element at all speeds so long as the body portion is in contact with the water, planes extended from opposite sides of said body portion having movable parts and operable to sustain the structure during aerial flight and to assist in balancing the same during travel over the water, driven propelling means, and buoyant bodies extended at opposite sides of the body portion operable by contact with the water to assist in balancing the structure.

1,314,220. AEROPLANE SAFETY DEVICE. Frank P. Sargent, San Francisco, Cal. Filed Feb. 12, 1919. Serial No. 276,526. 4 Claims. (Cl. 244—21.)



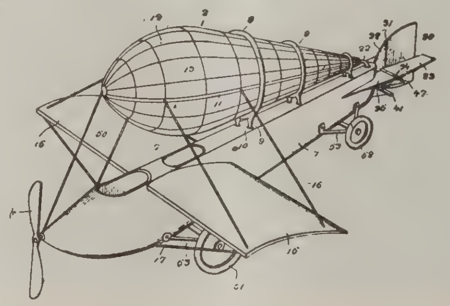
1. A safety device for aeroplanes, comprising a parachute mounted on the body of the plane with its top foremost to drive it, a container for said parachute fixed to the aeroplane and having distensible walls, pivoting means whereby said container may be swung outwardly from the machine, means for distending the walls of said container when the same reaches its outward position, whereby the parachute will be exposed in an unrestricted condition to allow it to be opened by the wind pressure.

1,322,976. AEROPLANE. Willard Irving Twombly, New York, N. Y., assignor, by mesne assignments, to D. Stuart Dodge, Weatogue, Conn. Filed Dec. 4, 1911. Serial No. 663,873. Renewed April 16, 1919. Serial No. 290,640. 12 Claims. (Cl. 244—25.)



9. In an aeroplane, the combination wtih the supporting plane, of a pair of tractor propellers, a transverse shaft, gearing connecting said shaft with the propeller shafts, a pair of engines and a pair of over-running clutches on said shaft, means to cause the engines to drive the shaft through said clutches and means connected to the clutches to be actuated by the operator to impart movement to the shaft to start said engines.

1,299,287. FLYING MACHINE. John Barto, Cleveland, Ohio. Filed Jan. 19, 1918. Serial No. 212,691. 1 Claim. (Cl. 244—6.)



In a flying machine, the combination of a body, wings extending on opposite sides of the body, an aerostat of dirigible balloon formation arranged above and in spaced relation to said body, connecting means between said aerostat and body, propelling means, directional means, each wing comprising a plurality of spars having pivotal connection with the body of the machine whereby the wing is adapted to be folded like a bellows and lashed to the body of the machine for transportation, and gears geared to and adapted to be driven by the cylinders when the same are rotated, and means for imparting turning movement in one direction or the other to said rotatable ring to effect tilting of the motor and the shaft toward one side or the other.

AERIAL AGE
WEEKLY

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American Naval Aviation Officers at Howden, England, Preparing to Bring Over the R-38

The Aeronautic Patent Situation

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TABLE OF CONTENTS

PAGE
The Aeronautic Patents Situation.. 573
The News of the Week........... 575
The Aircraft Trade Review....... 577
The Pacific Hawk............... 578
Preliminary Report on Free Flight Tests......................... 579
Book Reviews.................. 581
Distribute the Victory Medals..... 582
New Safety Cowling Designed to Eliminate Injury to Face........ 583
Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures............. 584
Naval and Military Aeronautics.... 585
Foreign News.................. 586
Elementary Aeronautics and Model Notes....................... 587
Aeronitis 588
Recent Aero Patents............. 590

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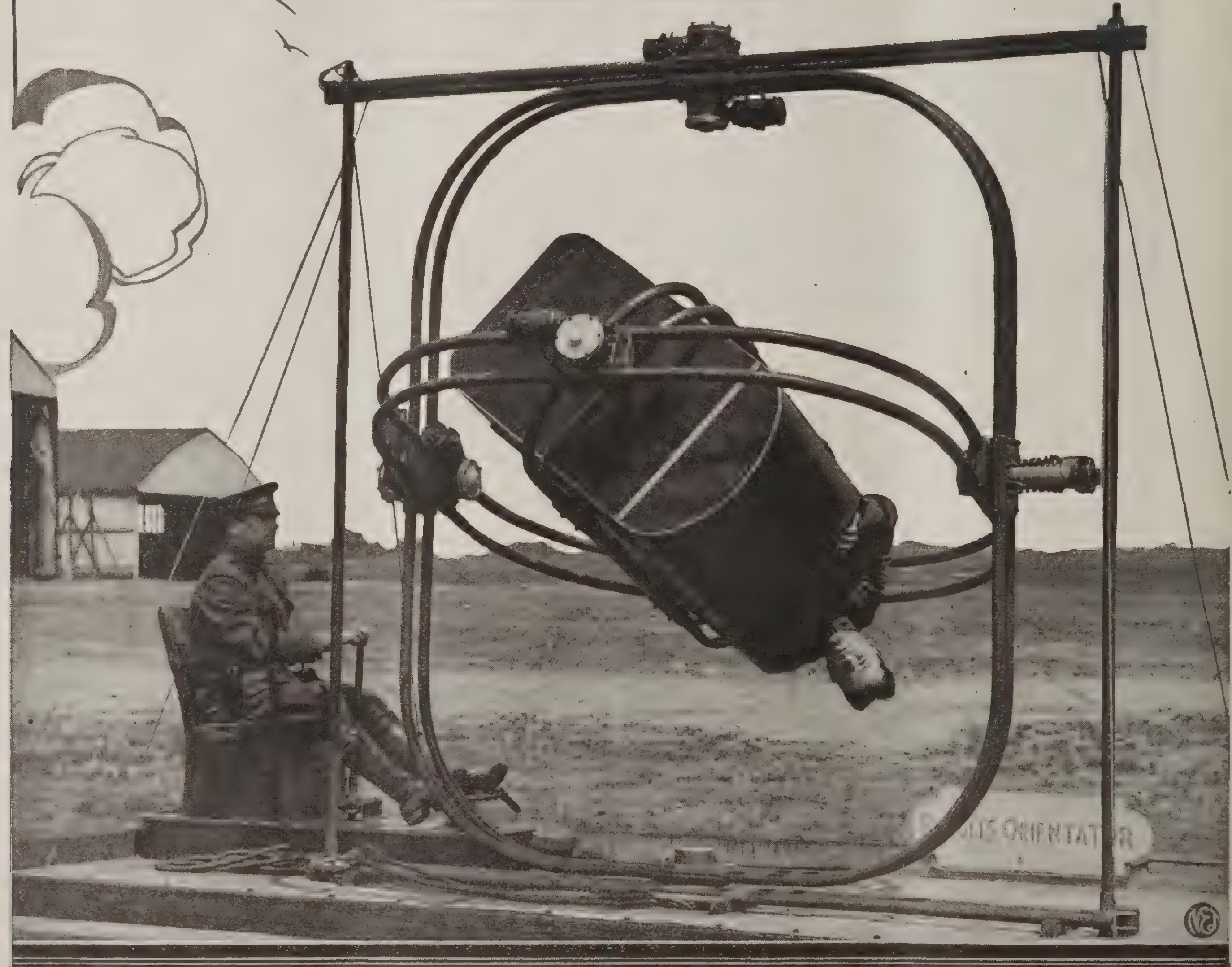
The fullest measure of **enjoyment** is realized by those whose **Fundamental Flying Faculties** are developed to a point of instinctive response to requirements in **all positions**, and who fly without imposing **excessive strains** upon their ships.

This invention **exclusively built, owned, and used by the Government during the war**, is now to become available for use in the civilian field. Some of the most successful and prominent flying instructors in America are becoming identified with this enterprise.

Personnel announced in succeeding issues



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THE AERONAUTIC PATENTS SITUATION

Court Decision Frees British Aeroplanes—Congress Objects to U. S. Being Made to Pay Millions for Royalties on American Patents Which Great Britain Bought for Only $95,000—Congress Did Not Authorize Payment of Royalties to Manufacturers Aircraft Association

FROM time to time during the past ten years we have had to supply information regarding the aeronautic patents situation; and we have, on different occasions during these ten years, taken an active part in projects intended to solve the problems that arose in connection with certain developments in the aeronautic movement.

We are entirely free to discuss, or advise on, this subject because we have never been stockholders in an aircraft manufacturing enterprise and have never charged or accepted fees or commissions of any kind for assisting in settling patent troubles, and have always even insisted on paying our own expenses when travelling in connection with such matters, and we are not today, and do not intend to become, financially interested in aircraft manufacturing enterprises.

Robert J. Collier and Harry Payne Whitney Almost Solved Problem in 1915

On a number of occasions offers we were made to us which were very alluring indeed. In 1915 we succeeded in interesting in the subject Messrs. Robert J. Collier, Harry Payne Whitney, and other prominent men, who promptly saw the necessity of solving the problems which stood in the way of American aeronautics, by buying the Wright patents, the Curtiss patents and the Montgomerey patents; as well as the James V. Martin patents, the Christmas patents, the Rex Smith patents, the Huntington patents, and other patents representing improvements like the Willoughby and Gallaudet patents; and financing aircraft manufacturers and developing the aeronautic movement as a whole on a progressive plan which would have built up a substantial aeronautic industry in the two succeeding years.

We outlined this plan as part of our patriotic work to build our aerial defenses, because we had found in connection with the National Aeroplane Competition that only a few of the manufacturers were in a position to stand the cost of making an entry in the Competition and could not get financial backing because it appeared that they could not compete with the Curtiss and Wright companies if they had to pay $1,000. per machine in royalties; and they did not have the backing necessary to fight legal action as the Curtiss Company was doing.

The proposed plan was adopted and we went to Dayton, Ohio to meet Orville Wright. We had authority to buy the Wright patents and the Wright plant for a total sum of one million dollars. We had previously ascertained from Orville Wright that he would accept the sum of $675,000. for the patents.

But Orville Wright had sold an option on his patents a few days before, and this option was held by interests allied with interests represented by Messrs. Collier and Whitney and we were assured that there would be no difficulty in carrying out the plan substantially as outlined.

Why We Could Not Become Directors and Stockholders in Corporation Controlling American Aeronautics

Partly as a reward for our efforts and partly as an inducement to continue to help carry out the plan we were offered a directorship in the organization to be formed, with a substantial amount of stock consideration.

The offer was tempting because under that plan it was apparent that the organization was to control commercial aeronautics in the United States, and as the aim of the gentlemen who were carrying out this plan was benevolent and almost altruistic, there did not seem to be any of the ethical objections which had kept us before and have kept us since from accepting a financial interest in aircraft manufacturing propositions..

But we knew that the greatest work to be done was to educate the country and Congress and that we would be handicapped in the work of educating the country and of urging and advising Congress to allow large aeronautic appropriations; and that our usefulness would be much less if we became connected with any manufacturing enterprise.

So we declined there and then and we even refused reimbursement of our expenses for having gone to Dayton and to other places to conduct negotiations. We felt that if we accepted expenses we could be charged with having been "employed" by commercial interests and Congressmen would henceforth discount our advice and urgings in connection with making larger appropriations for military and naval aeronautics.

We have had occasion to be thankful that we followed such a strict policy, In fact, whenever we appeared in Congress or urged Congressmen for increase or aeronautic appropriations we were always asked whether we held any stock in manufacturing concerns or whether we had been in the employ of aircraft manufacturers at any time. We have always been able to answer in the negative and our national defense work was, therefore, unhampered.

We recall the remark of a very prominent man who said to us then:

"You will make a great deal more money in this proposition in a couple of years than you'll ever make out of publishing!"

He was right in that, but we know now that our usefulness in the work for national preparedness would have been greatly impaired had we had an interest in aircraft manufacturing. Likewise the people who make up the new post-war aeronautic industry, the inventors and the thousands of people who make up the "civilian" aeronautic movement, would not feel at liberty to call on us for advice if we were interested financially in any manufacturing enterprise.

Wright and Curtiss Have Received Their Due and Sentiment is Removed from the Issue

We have always been and are now only interested in the welfare of the Aeronautic Movement as a whole. Owing to the fact that both Messrs. Orville Wright and Glenn H. Curtiss have been remunerated and are no longer the owners of the patents bearing their names, we are even relieved of the sentimental feeling towards their patents which made us lean towards them whenever we felt that the technicalities of legal justice threatened to overlook the obligations imposed by natural justice, and there seemed to be a possibility of Wright and Curtiss being personally deprived of reasonable returns.

Messrs. Wright and Curtiss have been remunerated and their patents are the property of the Corporations which have also made substantial profits on the comparatively small sums which they invested, in purchasing the Wright and Curties patents.

The matter has gone further afield. The patents have been and are being exploited by a third party, the Manufacturers

Aircraft Association, which is only a small group of individuals, whose methods have been condemned by the United States Senate Investigating Committee as "vicious and designed to reap large profits by taking advantage of the necessities of the Government."

The subject can, therefore, be discussed without sentimental considerations, as the United States Senate Investigating Committee did.

Present Situation Regarding British Aeroplanes and Construction of New Aeroplanes

There are three salient aspects to the aeronautic patent situation at present as follows:

(1) The situation regarding the sale of British "surplus" aeroplanes in the United States.

(2) The situation as it affects the sale of American made "surplus" aeroplanes.

(3) The situation as it affects the building or bringing of new aeroplanes in the United States.

Court Upholds Release of British Made "Surplus" Aeroplanes

Herewith is reproduced the opinion of District Judge, Augustus N. Hand, in the action of Curtiss Aeroplane & Motor Corporation against United Aircraft Engineering Corporation. We are informed by an attorney that the attorneys for the Curtiss Company that their appeal from the decision of Judge Hand has been heard in the Circuit Court of Appeals for this Circuit and that the decision of Judge Hand was affirmed, and further that they did not intend to appeal to the Supreme Court of the United States.

The decision follows:

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

CURTISS AEROPLANE & MOTOR CORPORATION,
Complainant,
—against—
UNITED AIRCRAFT ENGINEERING CORPORATION,
Defendant

Augustus N. Hand, District Judge:—

This is a motion to dismiss the bill which alleges that the British Government sold to the defendant certain aeroplanes which are stated to have been "manufactured in Canada under certain agreements between plaintiff and the British Government or its duly authorized agents, of which profert is thereby made * * * ." While the bill goes on to allege that under these agreements, "Such aeroplanes were manufactured for sale to or use by the British Government only. * * * ." I have held upon a motion for a preliminary injunction that the arrangement *"while creating but a personal license that was non-assignable freed the product as much as a sale would do from the monopoly of the patent and enable them to sell it for use anywhere as fully as though they had purchased it from the patentee."*

The bill alleges that "as an example of such infringement plaintiff alleges that defendant has sold in the Southern District of New York an aeroplane designated by defendant as Canadian Curtiss or Canadian J N-4 machine and that such aeroplane is an infringement * * * ."

The complainant agrees that by reason of the above phraseology the bill embraces more subjects of infringement than the J N-4 machines. I think, however, that this is a narrow construction of the meaning of the bill, because, in spite of the foregoing language, the allegations of subdivision X of the bill, where the infringements referred to are described, specifies only aeroplanes manufactured under the contracts "of which profert is * * * made." Counsel for complainant, at the time of the argument, did not suggest that he knew of any other infringements, and I think the fair meaning of the bill is that such infringements are limited to those mentioned in subdivision X. These I have held upon the foregoing motion are not in fact infringements because of the terms of the agreements under consideration. It seems much better to raise the whole question, which is not free from doubt by a decree dismissing the bill than to have the appeal taken merely upon an order denying a motion for a preliminary injunction, the issuance of which might be treated by the Circuit Court of Appeals as a matter of discretion with the District Court. For this practical reason, as well as because I think the bill can fairly be construed in no other way than that which I have indicated, I am of the opinion that the same should be dismissed. Inasmuch as the whole matter before the Court turns upon the construction of the written agreements between the parties which are a matter of record I see no reason for allowing the filing of an amended bill.

The bill is dismissed with costs.

A. N. H.
D. J.

August 19, 1919.

Decision Helped Progress of Aeronautics in United States

This decision of Judge Hand did much to help the progress of aeronautics during the past year, as it made it possible for aviators to obtain and operate at low cost British made aeroplanes with which to do the pioneer work of demonstrating the value of aeroplanes for various commercial uses. These machines were bought at very low prices from the Canadian Government, and while they were also sold at low prices, the dealers made substantial profits and the demand for spare parts and propellers, magnetos, radiators, carburetors and accessories created by the operation of these aeroplanes helped greatly to support the firms making and selling aeroplane supplies.

This decision was also responsible in inducing the importation of Avros, which supplied a pressing demand for aeroplanes which American firms were unable to meet.

Most of the aviators who bought the Canadian aeroplanes became customers for better types, therefore the Aeronautic Movement as a whole was assisted.

Congress Expected to Take Action, As British Government Paid Only $95,000 for Purchase of Wright and Curtiss Patents, While United States Government Has Already Paid Over $2,000,000 in Royalties, And is Still Paying.

AERIAL AGE printed in the February 9th and 16th issues some of the Congressional objections on discovering that the United States Government was made to pay royalties amounting to over $2,000,000, representing royalties of from $100 to $200 for each of the 15,200 military and naval aeroplanes manufactured in the United States between July, 1917, and March, 1920, and is still paying. Inasmuch as Congress had appropriated $1,000,000 for the purchase of patents under certain conditions and had not authorized paying royalties; and inasmuch as the British Government only paid $95,000 for the purchase outright of the Wright and Curtiss patents, Congressmen are in favor of having the Attorney-General take action against the Manufacturers' Aircraft Association as provided for under the Congressional resolution of April 12, 1920.

Payment of Royalties May Be Held Illegal, as Congress Only Authorized Purchase of Patents

The only authorization made by Congress regarding payments for use of aeronautic patents was the following act:

"To enable the Secretary of War and the Secretary of the Navy to secure, by purchase, condemnation, donation or otherwise, such basic patent or patents as they may consider necessary to the manufacture and development of aircraft in the United States and its dependencies for governmental and civil purposes under such regulations as the Secretary of War and the Secretary of the Navy may prescribe, $1,000,000;

PROVIDED, That such arrangement may be made in relation to the purchase of any basic patent connected with the manufacture and development of aircraft in the United States as in the judgment of the Secretary of War and the Secretary of the Navy will be of the greatest advantage to the Government and to the development of the industry;

PROVIDED FURTHER, That in the event there shall be pending in court litigation involving the validity of said patent or patents bond, with good and approved security in an amount sufficient to indemnify the United States, shall be required, payable to the United States, conditioned to repay to the United States the amount paid for said patent or patents in the event said patent or patents are finally adjudged invalid."

Government officials who approved the payment of royalties admit that they approved the principle only because they were assured and a wide impression was created by the Manufacturers' Aircraft Association that only a few hundred aeroplanes could be built in 1917 and less than one thousand in 1918 and 1919, and the Government would save money paying royalties of $200 per aeroplane. Instead 15,200 aeroplanes were built and royalties paid on them! And no arrangement was made for the proper bonds to protect the government as required by the law. Congressmen are justified in considering the funds paid in royalties under these circumstances as "trust funds" and objecting to the spending of these funds lavishly as the M. A. A. has been doing, especially as most of the members of the M. A. A. have gone out of business and there is danger that the remaining members would not be in a position to indemnify the Government if the verdict should be that the bulk of the sum paid must be reimbursed to the Government.

Manufacturers Aircraft Association May Have to Reimburse Government of Royalties

The members of the M. A. A. are in a precarious position under the circumstances. Any American citizen can start action against the M. A. A. to stop its spending the moneys paid to it by the Government under the circumstances referred to.

AERIAL AGE will deal with other aspects of the subject in succeeding issues.

THE NEWS OF THE WEEK

JL-6 Makes 1200-Mile Non-Stop Flight

Philadelphia. — Practically unheralded, the Larsen all-metal monoplane made a non-stop flight on June 27th from Omaha, Neb., to a point 20 miles east of Lancaster, Pa., or a distance, according to the pilot, of 1,200 miles by the route followed. This establishes a new non-stop record for the United States for a single motored plane with three passengers aboard.

It had been the intention to proceed to New York and land at Central Park, L. I., but the dense haze which was encountered in the vicinity of Lancaster forced Bert Acosta, the pilot, to descend in a potato patch.

After getting his bearings and a bite to eat at a farmhouse, Acosta made the hop to the Curtiss field at Pine Valley, N. J., where he and his passengers spent the night. The time for the landing at Lancaster was said to be 5:06 o'clock. Mr. Larsen said that the plane had used approximately 105 gallons of gasoline.

"We struck hazy weather after we left Chicago," he said, "and though the weather grew more favorable later, still we couldn't see much. We were flying by compass, of course, but when we got near Lancaster the haze forced us down. We maintained an altitude of between 4,000 and 9,000 feet all the way. I am sure we have established an American record for a non-stop flight. Had it not been for the haze we could have kept right on to New York."

The flight to Central Park, L. I., was continued the following day. The distance from Pine Valley to the Larsen aerodrome at Central Park, over a hundred miles, was made in 50 minutes.

Fifteen minutes after he had landed at Central Park, Mr. Larsen started for Washington in another machine of the same type.

To Select Landing Field at Dawson for Yukon Flight

Dawson, Y. T.—The Canadian air board's representatives, according to word received here, are leaving Prince Rupert for Dawson to select a landing site for the proposed Yukon-Nome-New York air flight.

Benefit for Aerial Police

A benefit performance for the Aerial Division of the New York Police Reserve was presented recently in the Casino Theater. About $2,000 was obtained.

The Police Department has about 100 trained flyers and the money from the performance will aid them in carrying on the organization started in 1918.

Aero Service Established at Lake Placid

Lake Placid, N. Y.—Aeroplane trips via the Century Air Line, which have been started at Lake Placid, have become popular with members of the summer colony, who are taking advantage of the opportunity afforded to view the region from the clouds. Piloted by Lieutenant Solomon, formerly of the British Royal Air Forces, a seaplane daily makes trips above Lake Placid and Mirror Lake and circles the summit of Mt. Whiteface and nearby peaks. The seaplane made the flight across the mountains from Lake Champlain at Plattsburg, piloted by F. Paul Stevens, formerly of the naval aviation forces of this country. Later in the season the seaplane will make trips on certain days of the week across the mountains from Lake Placid to Paul Smiths on the St. Regis chain of lakes, thence to Saranac Inn on the Upper Saranac Lake and thence to the Lower Saranac and back to Lake Placid, carrying passengers between these points.

Farman Makes Record Flight

Mr. Harrison R. Tucker of the Southern Aeroplane Company flying a Farman "Tourabout" with two passengers and himself established record flying time for the 98 miles between Greensboro, North Carolina and Charlotte, North Carolina, making the distance in 50 minutes at the rate of 117½ miles per hour.

Gov. Edwards Christens Air Yacht

A huge white flying yacht went shooting across the waters of Raritan Bay one day last week driven by two Liberty motors. Just at the moment when the craft leaped from the water into the air Gov. Edward I. Edwards of New Jersey, standing in the front cockpit, smashed a champagne bottle on the bow and christened her the "Aeromarine F5L Navy Cruiser."

The machine is a twelve-passenger flying boat which is the largest civilian-owned craft of its kind in this country. The ceremony took place in front of the Aeromarine Plant and Motor Company's plant, at Keyport, N. J., and was witnessed by a crowd of about 250 persons. W. H. Alexander, former Navy aviator and considered one of the best seaplane pilots of H-16 and F5L planes in the Navy, was the pilot.

After the christening the yacht flew north to the south shore of Staten Island, flew along out to the channel, giving the passengers a sight of Sandy Hook's white arm, and then back along the Jersey coast to Keyport. Among those on board when the boat was christened were Inglis I. Uppercu, president of the Aeromarine company, Deputy Police Commissioner Joseph Faurot, Mrs. J. H. Van Mater, Mr. and Mrs. Fay L. Faurot and Paul G. Zimmermann, aeromarine engineer, who designed the ship, Howard Mingos and a *Sun and New York Herald* reporter.

Harvard Plans Course for Aviators

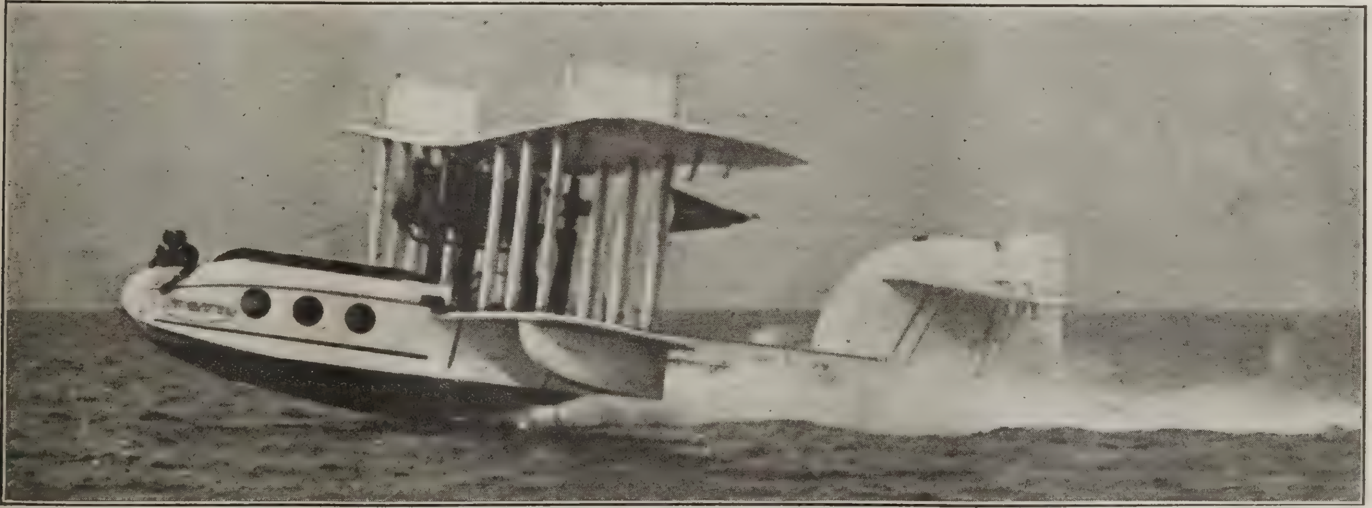
Cambridge, Mass.—In order that Harvard may still be represented creditably in intercollegiate aeronautics after the ex-service men have left college, plans have been made to train novices in the sport next fall. Most of the college's experienced air men will be graduated this year or at the end of next.

Col. L. H. Drennan of the northeastern department plans that college men will be trained at summer aviation camps in three periods of six weeks each, and will receive their reserve commissions at the end of the third summer. If this is approved by the army aviation committee, there will be a constant supply of well-trained flyers to fill the gaps made by graduation.

At present there are about 60 members of the Aeronautical Society at Cambridge, most of whom were trained during the war. Of this number more than half will receive degrees this commencement and the remainder will be graduated next spring.

Lt. Col. Piccio, Italian Ace, Marries

The marriage of Miss Lorenda J. Batchelder, daughter of Mrs. Julia O. Batchelder, and Lieut. Col. Pier Ruggero Piccio, of the Royal Italian Air Force, recently took



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Governor Edwards of New Jersey Christening one of the "surplus" U. S. Navy F.5L Seaplanes being operated by the Aeromarine Company as a Passenger Cruiser at Keyport, New Jersey

place at the Hotel St. Regis, New York City.

Mrs. David N. Joyce attended the bride, and Giacomi Caproni, the inventor of the Caproni aeroplane, acted as best man. The Italian Consul General, Propiano Tritoni, attended, also Alessandro Guidoni, Air Attache of the Italian Embassy in Washington, and the President of the Board of Aldermen, New York City, F. H. LaGuardia, whom the bridegroom had known on the Italian front.

The couple left for Spring Lake, N. J., on their honeymoon. They will reside in Paris.

The bridegroom is an "ace of aces," with forty-two enemy planes to his credit, thirty-two officially recognized. He holds the highest award for gallantry in the Italian Government, the Gold Medal of Valor, of which there are not more than twelve holders living. He also holds three Silver Medals of Valor, the War Cross, the Order of St. Michael and St. George of the British Empire, and the Belgian War Cross. He is an officer of the French Legion of Honor.

Formation of Royal Air Force Memorial Fund

Announcement has just been made regarding theh formation of a Royal Air Force Memorial Fund. Briefly the object of the fund is to create an organization to secure lasting benefits to the officers, N. C. O.'s and men of the Royal Air Force and their dependents worthy in every sense of the achievements commemorated.

The material objects in view are firstly, the erection of a commemorative monument; secondly, the establishment of places of residential education for the children of airmen, and, thirdly, the provision of bursaries for the children of officers.

Illustrated pamphlets descriptive of the purpose of the fund and the particular appeal which it makes to those who have been connected directly or indirectly with the Royal Air Force can be obtained, on application, from the British Air Attaché, British Embassy, Washington, D. C.

Seattle Progresses in Aviation Work

Seattle.—Flying in the latest model Boeing aeroplane, Herbert A. Munter of this city made a flight of 500 miles at an average speed of 90 miles an hour, elapsed time, carrying as passengers F. W. Strang, representing the Seattle Chamber of Commerce, and Archie Munter, brother of the pilot.

This flight was made as the close of a four-day trip which took the plane across Washington, into Idaho and Oregon and back to Washington, including one crossing of the Cascades at an altitude of 10,700 feet. Besides demonstrating the general utility, efficiency and economy of a new and original model in aeroplanes, the flight served to map out a route for commercial aviation and aerial mail service in the Pacific Northwest.

Chambers of commerce and commercial clubs in the cities covered by the flight used the plane for the exchange of felicitations and pledges to co-operate in the establishment of landing fields.

Within ninety days Seattle will have the new aviation field at Sand Point on Lake Washington ready for use. Adequate provisions will be made for the landing and upkeep of both land and sea planes. The first clearing of 35 acres affords an L-shaped landing way, and the entire 219 acre tract, purchased by King county as a landing field, is to be cleared of its second growth timber and the field will be fitted to meet all requirements of army, navy, postal and commercial aviation.

All-Metal Aeroplane Flies From New York to Omaha

Omaha, Neb.—An all-metal aeroplane flew from New York recently to Omaha, bringing a huge wedding cake for the marriage of Miss Carita O'Brien of Omaha and John Markel of Lincoln. The flying time from Chicago was four hours.

John N. Larsen of New York, the owner of the plane, was accompanied on the trip by his wife, Mrs. Larsen, Major L. B. Lent of the Aerial Mail Service, Bert A. Costa, pilot, and Walter Buth, mechanician.

The wedding cake was three feet in diameter and eighteen inches in height.

Aero Club of Pennsylvania Hold Field Day

On Saturday, June 19th, the Aero Club of Pennsylvania held its monthly meeting at its official flying field, the Aerodrome of the Philadelphia Aero-Service Corporation. A good turnout of members were present, many of whom brought their friends and families for an afternoon in the open and for the opportunity of taking aeroplane flights at the special rate extended to the Club and its friends.

The affair proved so enjoyable that it was unanimously decided to hold the July meeting at the field also. The field is well adapted to picnic purposes being easily accessible by automobile and trolley and situated in a delightful country, ideal for flying and recreation purposes.

McLaughlin and Kelly on Exhibition Tour

An extensive exhibition tour is now being carried out by McLaughlin and Kelly, aerial acrobatic performers. This company comprises Harry McLaughlin who does many stunts on the aeroplanes in the air, Lts. J. N. (4) Kelly and Harry Nunn, pilots, H. Black and C. W. Adams.

They have been engaged for the B. P. O. Elks Convention at Chicago, July 5th to July 10th, to give several exhibitions. Immediately following this engagement, their tour will cover almost every state and part of Canada.

Wright Memorial Address By Commander Hunsaker

The Wilbur Wright Memorial Address for 1920 was delivered before the Royal Aeronautical Society in London, on June 22, Prince Albert presiding, by Commander J. C. Hunsaker, Construction Corps, U. S. Navy.

In July, 1912, a fund was raised by public subscription in England to perpetuate the memory of the American pioneer in modern aeronautics, Wilbur Wright, by providing for an annual "Wilbur Wright Memorial Address," before the Royal Aeronautical Society. This address has been given annually since 1912 on a date near Wilbur Wright's birthday and marks the state of the art and progress in aeronautics from year to year. Previous addresses have been given by the following authorities:

The address this year was entitled "Naval Architecture in Aeronautics," and took the position that the experience in aeronautics resulting from four years of war has made available such a mass of information that the methods of the Naval Architect should now be employed to analyze it and render it available for use. By this means the trend of design can be revealed and the most useful directions for improvement predicted.

The author illustrated this conclusion by charts giving the percentage distribution of weight in the construction of 200 aeroplanes and showed that there is a definite trend toward higher wing loadings in the large flying boats, and concluded that for weight carriers giant flying boats have the advantage over large land aeroplanes.

The use of the model tank for predicting the planing properties of flying boats hulls from experiments on small models was illustrated by ultra rapid moving pictures taken at nine times the speed of the ordinary commercial machine. When projected at a speed one-ninth of the speed of taking the pictures slow up the motion so that the wave formation can be studied in detail. The scheme amounts to projection on a magnified time scale.

The invitation from the Royal Aeronautical Society to an officer of the U. S. Navy to deliver the 1920 Wilbur Wright address is considered to be recognition of the advanced position in aeronautical design reached by the Navy Department during the war.

Pathfinders of the past and present. An Indian and an aeroplane at St. Challes, Manitoba

The AIRCRAFT TRADE REVIEW

Plan Spokane, Wash.-Lewiston, Idaho, Aero Service

Spokane, Wash.—A twice-a-week aerial passenger service between Spokane and Lewiston, Idaho, is being established by the United States Aircraft corporation of Spokane. It is believed that this will prove to be a very popular trip as the route is a very beautiful one. The planes will make the trip in about 80 minutes each way.

Massachusetts Creates Aeronautic Board

Boston.—All aircraft operating in Massachusetts must be registered and display an identification number, according to a ruling which has been approved by the Governor and his council. Up to the present time no effort has been made to enforce laws enacted last year, but the increasing number of flying machines in the air each day has caused legislators and public authorities to act.

The first step taken is the creation of a board to pass upon all applications for pilots' licenses and aeroplane registration. This board will operate under the department of public works, and its members will be men interested in flying, serving without pay. Precautions will be taken to prevent passenger carrying by inexperienced pilots.

Other duties of the board will be to investigate complaints and enforce reasonable rules of the air. It is not the intention of Commissioner John N. Cole to establish an aerial police force.

Gallaudet Planes at Rhode Island Aviation Field

The Gallaudet Aircraft Corporation of East Greenwich, R. I., is setting up about 40 aeroplanes for the U. S. Government, at the Aviation Field of Rhode Island, Hillsgrove. The planes are to be flown to Mineola, Long Island, and some will be then used for the New York-Alaska flight.

This field is known as Rhode Island 43.

Pan-American Aeroplane Exchange Organized

The Pan-American Aeroplane Exchange has been organized in Cincinnati, Ohio, and will act as a distributing agency for various types of aeroplane and motor accessories. The Company will also act as Sales Agents for aeroplane companies and plans are now being completed for a suitable field where machines can be demonstrated to prospective purchasers. When the field is completed, passenger carrying, aerial advertising and exhibition work will be engaged in.

Wright Aeronautical Corp. Moves to Paterson, N. J.

Wright Aeronautical Corporation of America, 40 Wall Street, New York, has decided to defer the erection of its proposed new plant at Newark, N. J., estimated to cost about $300,000. For occupancy about May 1, it has leased a four-story, steel and concrete building, 75 x 300 ft., at Paterson, N. J., with adjoining site comprising about 7½ acres, and will establish its plant at this place. The property is valued at $500,000 and the company has privilege of purchase. Employment will be given to about 500 for initial operations. It is a successor to the Wright-Martin Corporation.

R. G. Landis With Critchfield & Co.

Reed G. Landis has joined the Eastern organization of Critchfield & Co., Chicago, with offices at New York.

Mr. Landis was advertising manager of The Brunswick-Balke-Collender Company, Chicago, before the war. During the war he served in the United States Army Air Service from which he was discharged with the rank of major.

Following his discharge from the Army and prior to his connection with Critchfield & Company, Mr. Landis was vice-president of the Interallied Aircraft Corporation.

May Have Aviation School at Watertown, N. Y.

The establishment of an aviation school in Watertown, N. Y., by the Syracuse Aero Corporation may result from facts gathered by the chamber of commerce and placed before that company.

Ralph S. Baker, secretary of the chamber, found that a considerable number of local men are enthusiastic over flying and many have declared themselves willing to enter a flying school if one were established there.

This information has been laid before representatives of the Syracuse company.

Flying School Visits Aircraft Factory

The students and instructors of the flying school of the Philadelphia Aero-Service Corporation spent Monday, June 21st, at the Philadelphia Navy Yard, as guests of Commander Richardson .

The morning was spent in inspecting the Naval Aircraft Factory and the different types of flying boats at the yard. Great interest was manifested in the N. C. 7 which is nearing completion and will make its trial flight at an early date. The various types of German and Austrian seaplanes at the yard were also interesting.

After lunch at the Yard Cafeteria, the visitors were taken through the various workshops at the yard and also the battleship "Louisiana". The organization extended its thanks to Commander Richardson and Lieutenant Dunlap for their attention and courtesies.

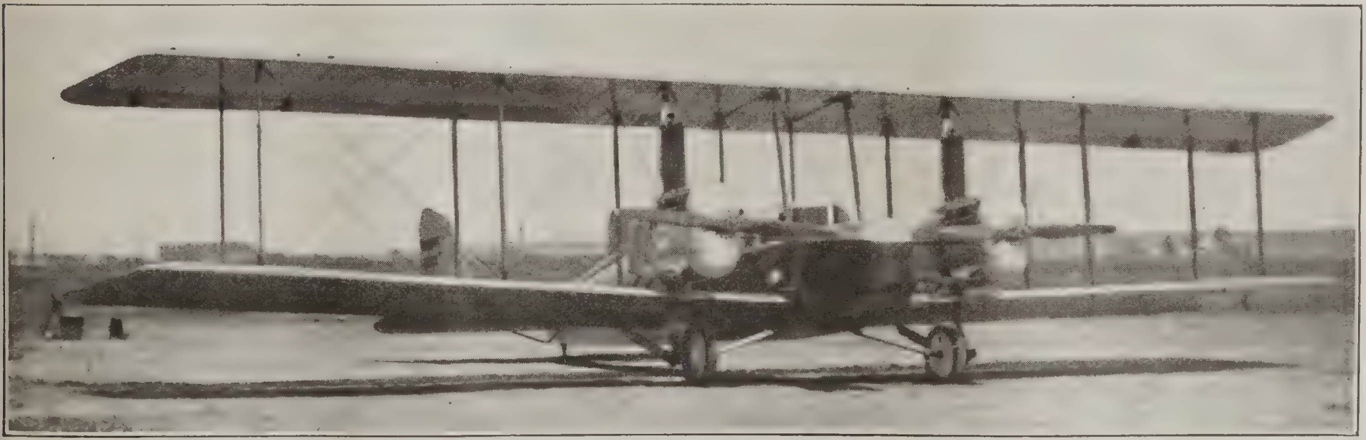
Why Aeroplanes Are Necessary

A bank in Kansas failed because it could not get a shipment of money in time. The present laws will not permit the Post Office Department to use its aeroplanes to carry money to banks in distress.

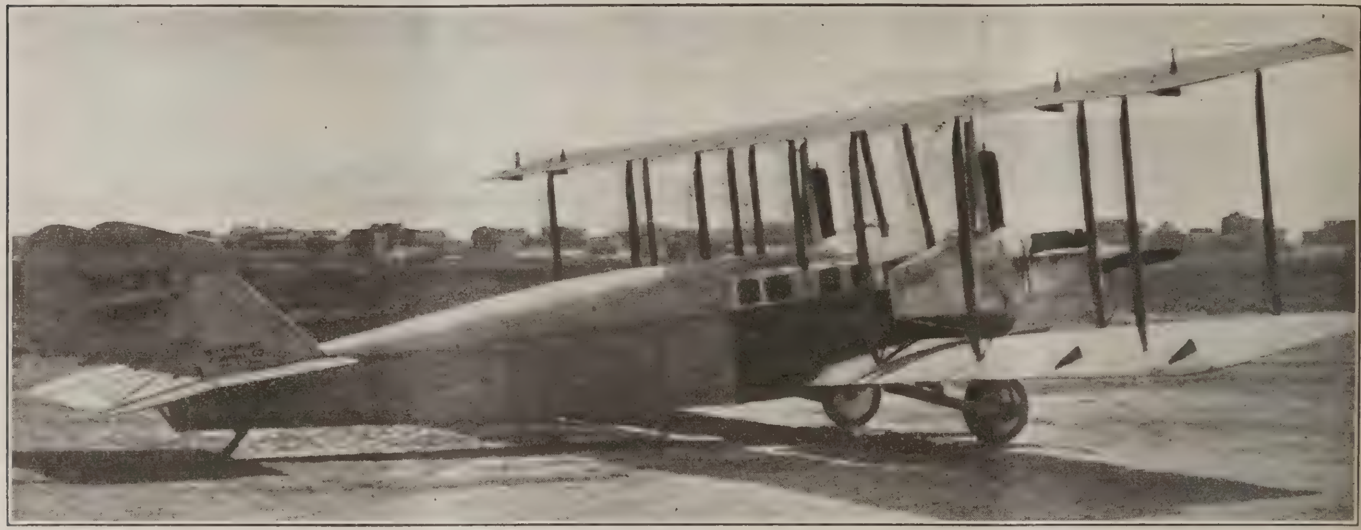
It is hoped that the men who are engaged in the building of the platforms of the two great political parties will add a plank recommending that such laws be enacted. The aviation plank in the political platforms should be broad and solid.

Seven Centuries of Brass Making

We have recently received from the Bridgeport Brass Company, Bridgeport, Connecticut, a most interesting brochure under the title "Seven Centuries of Brass Making" which traces the development of the application of brass to modern industry from the very earliest period. It is a contribution to an important subject worthy of a space in the libraries of every organization who are in any way interested in brass products.



The twin-motored Pacific Hawk described in detail on page 578 of this issue



THE PACIFIC HAWK

TO meet the demand for a low priced pleasure or commercial aeroplane of the twin motor type and capable of carrying six persons, the Pacific Airplane and Supply Co., of Venice, Calif., has built the "Pacific Hawk." O. W. Timm, engineer for the company, designed the machine.

The "Pacific Hawk" is a six place, enclosed fuselage, twin engine biplane. The fuselage is built almost entirely of spruce and covered with plywood from the nose to the rear of the cabin and from the tail post to the skid section. The balance is covered with linen. The cabin is constructed of aluminum and Ultra-glass is used for windows. Three double wicker seats are set in tandem. Dual Dep control is operated from the front seat. One 40 gallon gasoline tank is mounted in the nose and one 40 gallon tank is mounted back of the rear seat. The gasoline is circulated from the main tanks to the gravity tanks in the center section by two air driven pumps. Each motor, with gas tanks, etc., is an independent unit. The landing gear is of a two wheel type with the wheels under the motors and the landing shocks are taken through the motor sections. The axle is hinged to the fuselage to take the side thrust. 30 by 5″ wheels are used. The tail skid is slung on rubber cord and the tail skid mounting is of tubing construction designed to distribute strains evenly to the four longerons.

The main planes are in five sections. Ribs are designed from R. A. F. 6 data. Beams are of I section built up of three laminations of spruce. Ailerons are attached to both upper and lower planes and are 14′ long and 18″ wide, constructed of wood. The main planes have each 40° angle of incidence. The lower planes have a dihedral of 2½°, the upper planes none.

Tail Group: The stabilizer is built of wood and has a width of 14 ft. and depth of 4′ 3″. The elevator is built of wood and has an overall width of 15 ft. and 3 ft. depth. The fins and rudders are built of steel tubing. Overall dimensions of the rudders are 60″ by 36″.

Motors: Two OX5 Curtiss motors with 8′4″ by 5′6″ pitch propellers are used. Free air radiators are mounted over the motors.

Specifications

General Dimensions

Span, upper plane	52′ 0 ″
Span, lower plane	52′ 0 ″
Chord, upper plane	6′ 6 ″
Chord, lower plane	6′ 6 ″
Cap between planes at fuselage	7′ 2½″
Overall length	32′ 0 ″
Overall height	10′ 8 ″

Areas

Upper planes (with ailerons)	338 sq. ft.
Lower planes " "	318 sq. ft.
Total area	656 sq. ft.
Ailerons (four)	each 21 sq. ft.
Stabilizer	55 sq. ft.
Elevator	41 sq. ft.
Fins (two)	each 5¼ sq. ft.
Rudders (two)	each 13 sq. ft.
Loading per square foot	6 lbs.

Fuselage

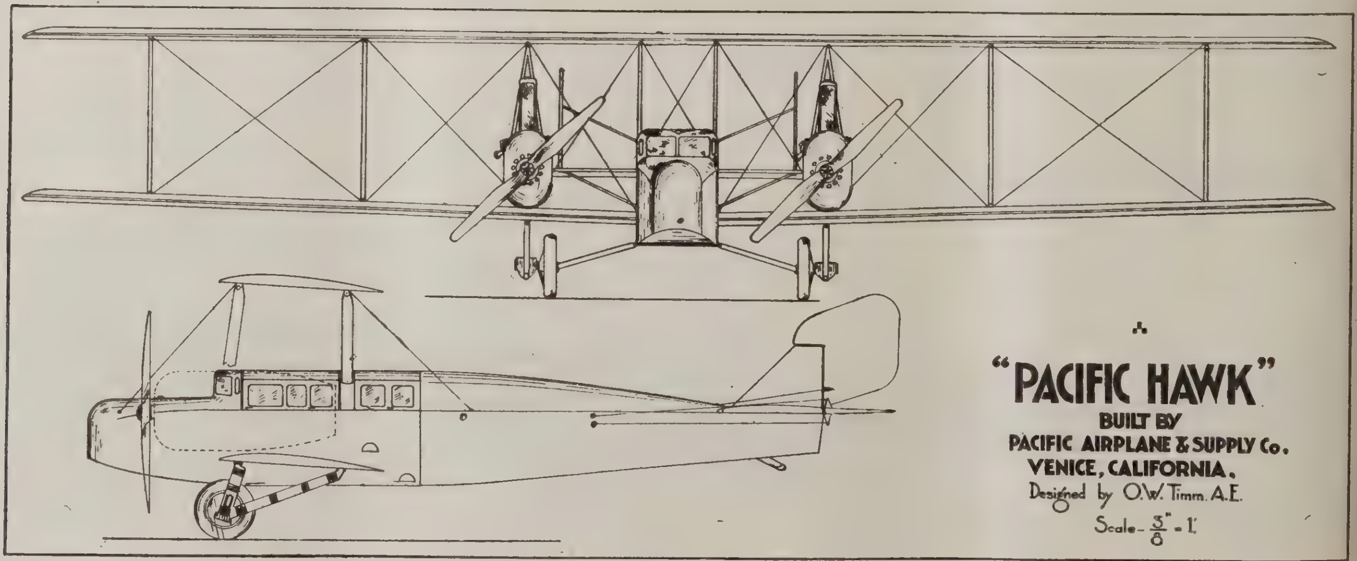
Length overall	29 ft.
Width	38½ ″
Depth (not including cabin)	36 ″
Depth (including cabin)	55 ″

Weights

Net weight (empty)	2630 lbs.
Gross weight (fully loaded)	3950 lbs.
Useful load	1320 lbs.

Performance

Maximum speed	82 M.P.H.
Minimum speed	47 M.P.H.
Climb in 10 minutes	4100 feet
Range of endurance	6 hours



PRELIMINARY REPORT ON FREE FLIGHT TESTS

BY EDWARD P. WARNER AND F. H. NORTON

(Report No. 70, National Advisory Committee for Aeronautics)

(*Continued from page* 547)

Determination of Lift and Drag Coefficients: Methods Employed

It is very desirable that data be obtained on the lift and drag in free flight of full-sized aeroplanes and parts thereof, in order that the designer may gain some knowledge as to the corrections to be applied to wind-tunnel results and as to the extent to which those results can be trusted. The problem is an extremely difficult one for many reasons, some of which will be discussed in detail later on in this report, and the work which has so far been done leaves much that is uncertain and many questions the solution of which can not even be attempted until new types of instruments and more accurate experimental methods have been devised.

There are three methods which have been suggested and employed to some extent for finding the lift in flight. The first two permit of the determination of the lift of separate parts (in particular, the wings), while the third, the simplest, and the only one which has been used in the work done at Langley Field, gives only the lift coefficients for the aeroplane as a whole. The first and most obvious of these methods proposes the measurement of the lift of any part by the interposition of weighing devices between that part and the remainder of the aeroplane. For example, the wing hinges might be attached to the body through the medium of springs. There has been a great deal of discussion of the possibilities of this method, but the mechanical difficulties are considerable, and not much actual work has been done. The second method depends on the measurement of the pressure at a large number of points on the surface of the wings (and, if desired, on the tail of the body) and the determination of the total lift by the integration of these pressures over the whole surface. This has been used to some extent in England, and similar work is planned for Langley Field during the coming year. The pressures can be measured, once the apparatus is satisfactorily constructed, with great ease and accuracy, and the only errors to which the method is subject are those inherent in all free-flight measurements.

The third method is, as was just noted, the simplest, in that it requires the least special apparatus. In the equation $L = L_c \times \frac{p}{g} \times V^2$ it is known that L is equal to the weight of the machine when the flight path is horizontal, and that it departs only very slightly from that figure for any ordinary inclination of the path (short of a steep dive). Since p can be computed from measurements of the pressure and temperature, the determination of L_c requires only the measurement of V. As a matter of fact, since the air-speed meter records not the true speed but the product of $V \times \sqrt{p/p_0}$, the term p/g can be eliminated by the substitution of indicated for true air speed, and the equation above can be written:

$$L = L_cCV^2_1$$

Where C is a correction constant taking into account the gravity constant g and the conversion factor changing V_1 from miles per hour to feet per second. Although a small part of the lift is due to the body and the tail surfaces have a substantial effect at some angles, it is convenient to divide the lift by the wing area and write the above equation in the form

$$L = L_cCAV_1^2.$$

With a good meter and careful calibration the air speed can certainly be determined with an error of less than 1 mile per hour and probably less than ½ mile per hour, and the lift coefficient at any given instant during a flight can therefore be computed very accurately. In substituting for L in the characteristic equation, allowance has to be made for the progressive diminution of weight by the consumption of fuel and for the direct balancing of part of the weight of the machine by the vertical component of the propeller thrust.

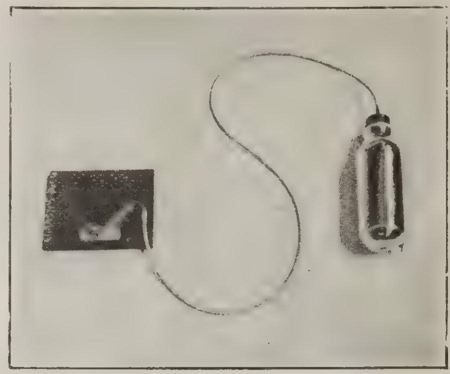


Fig. 9. Statoscope

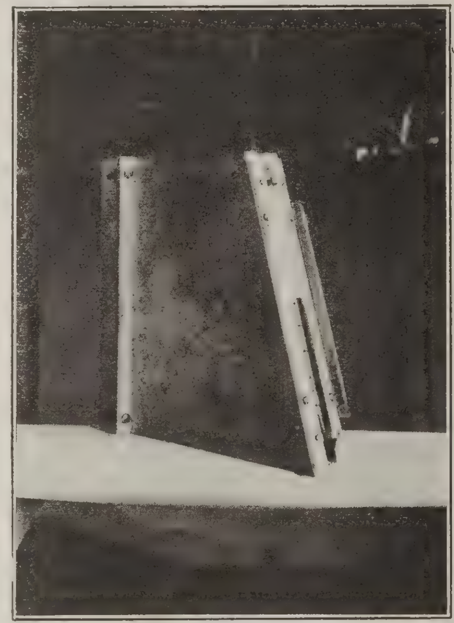


Fig. 10. Inclinometer

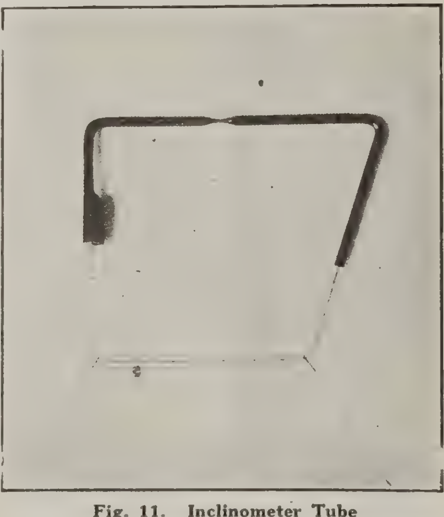


Fig. 11. Inclinometer Tube

Since the lift coefficient is a function of angle of attack, it is of very little use to compute the value of the coefficient at any instant during a flight unless this angle at the same instant is known, and it is in the determination of this angle that the greatest difficulties arise. The conventional type of "incidence indicator," embodying a pivoted vane and two Pitot tubes at a considerable angle to each other or a sphere pierced with two holes, is useless unless some other means is employed to calibrate it in position, as the instrument has to be placed in air disturbed by the passage of the aeroplane, and the motion of the instrument relative to this disturbed air, as already noted in connection with the calibration of the air-speed meters, may be of quite a different nature from its motion relative to the air at a great distance. The disturbance of the air by the wings extends to so great a distance (three or four chord lengths) in front of the leading edge that it is impracticable to carry the incidence indicator far enough forward entirely to escape this disturbance.

Since the angle of attack is the inclination of the wings to the relative wind, it is equal to the difference between the inclination of the wings to any fixed reference plane and the inclination of the relative wind to the same plane. In particular, the angle of attack can be determined if instruments are available which will give the angles between any line fixed in the aeroplane and the horizontal and between the relative wind and the horizontal. The first of these angles is given, provided that the machine is in steady rectilinear flight, by a liquid longitudinal inclinometer. The second can not readily be determined directly, but the inclination of the flight path to the horizontal is given by a rate-of-climb meter in conjunction with an air-speed meter, and this is equivalent to the inclination of the relative wind if the movement of the air is exactly horizontal. In the particular case where the flight path is level the rate-of-climb meter can be replaced by a statoscope. The largest error in the determination of angle of attack by this method arises from the assumption that the air moves only horizontally. An ascending current having a velocity of only 1 foot per second changes the angle of attack, for a given attitude of the machine relative to the earth, by nearly 0°.7 at an air speed of 60 miles per hour. This is a very gentle ascending current, and it will be shown later that vertical currents which have actually been encountered during these experiments have affected the apparent angle of attack by more than 1°.

The statoscope used is shown in Fig. 9. The tube was kept separate from the vacuum flask, instead of mounting both

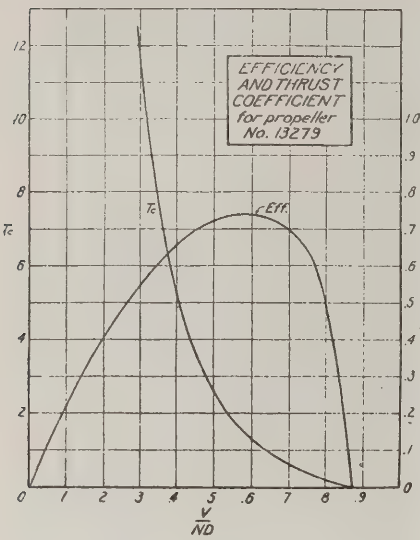


Fig. 12

in one case as is customary, in order that the flask might be placed behind the instrument board and the space occupied on the board be kept down to a minimum. The use of the statoscope makes it practicable to keep the mean rate of climb or descent down to 20 feet per minute except at very large angles of attack, and a rate of climb of 20 feet per minute affects the angle of attack at 60 miles per hour by less than 0°.25.

The ordinary commercial type of longitudinal inclinometer proved unsatisfactory, first, because the scale was not open enough to permit the angles to be read as closely as was desired, and, second, because the face of the instrument was perpendicular to the instrument board. The observer's eye being well above the board, the observer looked down on top of the meniscus and across it at the scale behind, and the parallax error was large. An instrument was designed to obviate these difficulties, and is shown assembled in Fig. 10. Fig. 11 illustrates the tube removed from the case. The front tube and scale make an angle of 20° with the surface which rests against the instrument board. The mean distance between the two surfaces of the column of liquid is 8 inches. The scale is divided in degrees, the divisions being roughly one-eighth inch apart, and it is easy to estimate to 0°.1. The liquid is a mixture of glycerin and alcohol, colored with red ink. The damping of oscillations depends on the viscosity of the liquid, and this can be controlled by varying the proportions of alcohol and glycerin. The tube is constricted at one point to increase the damping. Parallax was avoided by mounting a mirror beside the instrument, the observer bringing the reflection of his eye in line with the meniscus.

It unfortunately has not been possible to base the measurements of the drag entirely on data obtained in flight, as no satisfactory means of measuring the propeller thrust is available as yet. It is therefore necessary to rely on a wind tunnel test for the propeller characteristics. A partial check can be obtained on the wind tunnel results by measuring the slip-stream velocity, as described in another section of the report. Knowing the revolutions per minute and the true air-speed, the value of $\frac{V}{ND}$, the propeller slip function, can be computed, and the thrust can then be determined from a curve of T_c against $\frac{V}{ND}$. The equation for thrust is:

$$T = T_c \times p/g \times V^2 \times D^2$$

Since, as in the case of the lift $\frac{pV^2}{p_0}$ is equal to V^2, this may be written:

$$T = T_c \times C \times V_1^2$$

where C is a constant including correction factors for units and D^2, which is constant for a given propeller. A model of the propellers used has been tested at the Leland Stanford Jr. wind tunnel and the curves of T_c and efficiency are reproduced in Fig. 12. Plotting the thrust against the angle of attack, and dividing the total lift by the horizontal component of thrust, a curve of L/D can be obtained.

Serious as are the errors which ascending and descending currents produce in the lift curve, they are trifling compared with those which appear in the thrust computations, due to the same cause. An inclination of the relative wind has the effect of rotating through a corresponding angle the axes of lift and drag, so that the drag of the aeroplane is opposed not only by the thrust but also by a component of the weight. An ascending current having a velocity of 1 foot per second diminished the thrust required for level flight by 9 per cent if the L/D for the complete aeroplane is 8 and the machine is flying at 60 miles per hour. The error is directly proportional to the velocity of the vertical current and to the L/D ratio, inversely proportional to the speed of flight. If the rising current had a vertical velocity of 11 feet per second, the air speed and L/D being the same as before, no thrust would be required and the machine would soar without engine power. Such currents as this seldom if ever exist, but rising and falling currents of smaller velocities are almost omnipresent. They account for many seemingly wild results in this and other similar work, and the only way to eliminate their effects is to run a great number of tests of the same sort, under all light and weather conditions and over as many different types of terrain as possible, and then average the results.

Fig. 13. Cockpit and Instrument Board of No. 1

Fig. 13 shows the instrument board in the observer's cockpit of No. 1, with inclinometer, air-speed meter, altimeter, and tachometer installed. The altimeter does not appear in this photograph, being hidden behind the cowling at the right. The arrangement in No. 2 is practically the same.

The tests were carried out at altitudes varying from 1,500 to 4,000 feet. It was not considered safe, in view of the danger of falling into a spin when flying at large angles and of the possibility of a forced landing, to work below the former altitude. The altitude chosen on any particular day depends chiefly on air conditions, the climb being continued far enough to escape the "bumps" frequently found near the ground. Each "run" continued for from 1 to 2 minutes, the pilot being instructed to fly level (using the statoscope to detect changes in altitude) and at a constant air speed during that period. The observer read and recorded the readings of the air-speed meter, the inclinometer and the tachometer every 10 seconds, and noted the altimeter reading and the air temperature at the beginning of each run. The pilot's task was a very difficult one, for he had constantly to watch the statoscope and air-speed meter, in addition to holding the machine steady laterally and watching out for other aeroplanes. Besides all this, when flying over the speed course to calibrate the meter the pilot had to steer a straight course over the ground between the two observing stations. Test flying is a very highly specialized branch of work, the difficulties of which are not generally appreciated, and there is no type of flying in which a difference between the abilities of pilots thoroughly competent in ordinary flying becomes more quickly apparent. Most of the piloting for the committee has been done by Mr. E. T. Allen and Lieut. H. M. Cronk, but seven other pilots have been used on one or more occasions.

In order to determine the minimum speed in steady flight and to secure data for comparison with wind tunnel tests over the whole range of angles customarily covered by the latter, it was necessary to fly horizontally at an angle at least equal to the angle of maximum lift and as much larger as possible. The procedure in attaining these high angles was to throttle the engine to the lowest speed at which level flight could be maintained, and then open the throttle gradually, drawing the stick back at the same time. The aeroplane can thus be flown level in a very badly stalled condition, the action of the longitudinal controls being reversed (i.e., if the machine is losing altitude it is necessary to decrease the angle of attack, pushing the stick forward, in order to ascend). Furthermore, the aeroplane is very unstable laterally at angles in excess of 12° or 13°, and it is prone to fall off into side slips. Most pilots, in trying to fly at extremely high angles for the first time, are unable to keep the machine in equilibrium for more than a few seconds. One of the pilots flying for the committee, after considerable practice, became very skillful in this work and found it possible, given favorable weather conditions, to maintain steady level flight for an indefinite period with the throttle wide open and the machine stalled to an angle of attack of 18°

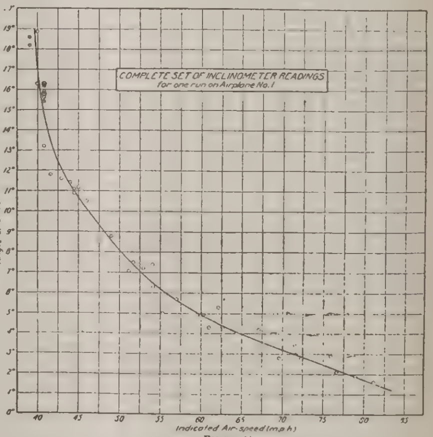


FIGURE 14.

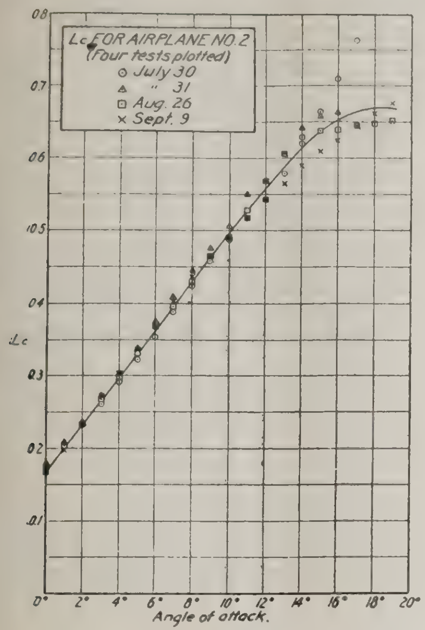


Fig. 15

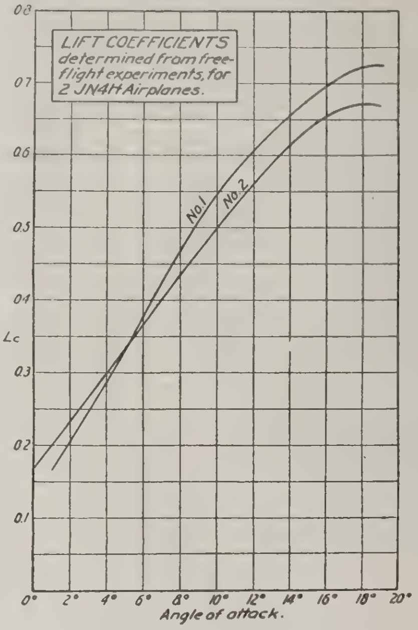


Fig. 16

or a little more. The ailerons alone are very ineffective in maintaining lateral stability at large angles, as any raising of one aileron greatly diminishes the drag on that portion of the wing, while drawing down the other aileron correspondingly increases the drag there. The result is that a large yawing moment, nearly if not quite sufficient to overcome the effect of the rolling moment due to the ailerons, is produced and tends to force the machine into a spin. It is necessary constantly to use the rudder in conjunction with the ailerons to a considerably larger extent than is necessary at normal angles.

Results of the Tests for Lift Coefficients

A number of tests (about 10) were made on each aeroplane. Some of these have not been plotted up or included in the averages, either because they were not extended over a large enough range of angles or because they contained results which were self-contradictory or because it was found, when an attempt was made to work them up, that essential data were lacking. In selecting tests to be incorporated in the final tabulation no attempt was made to pick those which would check well with each other, and the results were not even compared until the final choice had been made and the computations completed. In order to indicate the degree of consistency obtained among the various factors on successive observations in one typical flight, the angle of attack, as determined by the inclinometer, is plotted against the indicated air speed in Fig. 14. As already noted, observations on the two instruments were taken every 10 seconds, and each pair of readings is plotted as a separate point. Where two or more readings corresponded to exactly the same point the fact is indicated by the proper number of concentric circles. There are about 50 points represented in Fig. 14, yet there are only two or three which depart from a smooth curve by more than one-half degree.

Fig. 15 gives the curve of L_c against angle for No. 2, with all the points computed from four tests marked. At angles of attack up to 10° the agreement among the four curves is fully as good as would be expected for a like number of wind-tunnel tests on the same model. Beyond that angle they begin to diverge, but three of the four sets of points stay close together throughout. The very large discrepancy between these three and the fourth at large angles may be explained by the failure of the pilot in the July 30 test to hold the path level. In seeking to fly at the lowest possible speed, he probably allowed the machine to settle or "pancake," so that the true lift was less than the weight of the aeroplane.

(To be continued)

BOOK REVIEWS

THE TRIUMPH OF THE N.C'S: By *Commander G. C. Westervelt, Commander H. C. Richardson, and Lieut.-Commander A. C. Read.*

This volume gives the complete story of the flight of the N.C's told by the men who planned and did it.

Commander Westervelt's story is the interesting one of the planning and preparation, his story revealing that the N.C. type was the outcome of a plan to build airships that would carry themselves over to France and save cargo space. Commander Read tells the whole story of his epic flight in the "Lame Duck," the N.C.4. Commander Richardson tells how the N.C.3 kept the pace up to two hours' flight from the Azores, and although badly crippled, made her landing and proved to the world the durability of these American built "ships."

The book is from the press of Doubleday Page & Co., and is obtainable through the Aeronautic Library Inc., 299 Madison Avenue, New York. Price, $3.00.

APPLIED AERODYNAMICS: By *L. Bairstow*

The work aims at the extraction of principles of flight from, and the illustration of the use of, detailed information on aeronautics now available from many sources, notably the publications of the British Advisory Committee for Aeronautics. The main outlines of the theory of flight are simple, but the stage of application now reached necessitates careful examination of secondary features. The book is cast with this distinction in view and starts with a description of the various classes of aircraft, both heavier and lighter than air, and then proceeds to develop the laws of steady flight on elementary principles. Later chapters complete the detail as known at the present time and cover predictions and analyses of performance, aeroplane acrobatics, and the general problems of control and stability. The subject of aerodynamics is almost wholly based on experiment, and methods are described of obtaining basic information from tests on aircraft in flight or from tests in a wind channel on models of aircraft and aircraft parts.

This is a Longmans book and is obtainable through the Aeronautic Library, Inc., 299 Madison Avenue, New York. Price, $10.50.

LUCK ON THE WING; THIRTEEN STORIES OF A SKY SPY: By *Elmer Haslett,* Major, Air Service, United States Army Distinguished Service Cross, Croix de Guerre Française. Recipient of two special citations by General Pershing for conspicuous bravery and exceptionally meritorious service. Operations Officer U. S. Air Service, First Army Corps at Château Thierry and of First Army Observation Wing at St. Mihiel and the Argonne.

The work of a successful aerial observation officer in the great war has never been described with such humor or with such light-hearted jollity as it is in Major Haslett's thrilling book.

The author had a hobby for volunteering, and the practice of immediately responding when volunteers were asked for any service whatever led him into some remarkable situations which his native grit and some luck always got him through with credit.

A truly American story of strenuous and dangerous endeavor, full of action; high spirits, high courage, and the carefree personality of the writer.

The book is published by E. P. Dutton & Company and is obtainable through the Aeronautic Library, Inc., 299 Madison Avenue, New York. Price, $3.00.

BRITISH AIRSHIPS; PAST, PRESENT AND FUTHRE: By *George Whale (Late Major, R. A. F.).*

This book should make a very wide appeal. The public has had practically no authentic information as to the progress made in this branch since 1914, when British-made airships could scarcely be cajoled to pass their preliminary.

The volume treats of early airships and their development to the present day; British airships built by private firms; British army airships; early days of the naval airship section; naval airships; the non-rigids; the rigids; the work of the airship in the world war; the future of airships. The book is well illustrated.

It is from the press of John Lane Company and is obtainable through the Aeronautic Library, Inc., 299 Madison Avenue, New York. Price, $2.00.

APPLIED AERO-DYNAMICS: By *G. P. Thompson, M. A., Fellow and Mathematical Lecturer of Corpus Christi College, Cambridge, Captain "The Queen's" formerly Attached Royal Air Force.*

The author was attached for three years

during the late war to the Royal Aircraft Establishment and other technical departments where he had an opportunity of taking part in the rapid experimental development of aeronautics then taking place. He has since been on the technical staff of the Aircraft Manufacturing Company. An account is given of all the most important recent experiments and the practical conclusions that have been derived from them. In addition to a very full discussion of the qualities which determine the speed and rate om climb of an aeroplane and the method by which they can be calculated, special attention is paid to stability—a problem now fairly well understood, and to controllability—our knowledge of which is at present in a much more elementary state. Attention is directed to the numerous directions in which further information is required, especially in the form of full-scale experiments.

This is a scientific and mathematical treatise that has a special appeal to the student and engineer who are seeking exact information on the aerodynamics of heavier-then-air craft and data on Aeroplane design testing. This book gives an up-to-date presentation of the existing state of Aeronautical Science. The contents of the book include:

PART I.—PERFORMANCES

General Outline: Preliminary—Speed squared law—Angle of incidence and lift—Principles of flight—Stalling—Maximum speed and climb—R.A.E. chart—Controls—Stability—Strength. *Physical Theory*: Theory of dimensions—Resistance of wires and spheres—Scale effect—Newton's theory—Mathematical hydrodynamics—Theory of Pilot tubes—Venturi tubes—Discontinuous flow theory—Skin friction. *Experimental Methods*: Wind channels—Tests of bodies—Scale effect—Importance of fitting model airscrews—Tests of wings—Full-scaled tests—Pressure plotting—Performance tests—Interference. *Struts and Wires*: Tapered struts—Interference of struts—Fairing—Unstable flow—Round wires, cables—Streamline wires. *Wing Structure*: Loading as affecting speed, climb, and endurance—Gapchord ratio—Aspect ratio—Wing section—Variable camber—Stagger—Angle between chords—Small chord lower plane—Wing tips—Effect of hole in top plane—Triplanes—Monoplanes. *Bodies, Fuselages, Etc.*: Single-engined tractor bodies—Windshields—Fuselages without airscrews—Engine fairings—Wing interference—Change of drag with angle of incidence—Slip-stream effect. *Landing Gears and Miscellaneous Resistances*: "V" type landing gear—Wheels—Miscellaneous parts. *Airscrews*: Momentum theory—Aerofoil theory—Principle of design—Change of pitch—Inflow theories—Multiple interference theory—Tandem airscrews. *The Large Aeroplane*: General consideration—Weight of Wings. *Prediction of Performance*: Calculation of thrust horse-power—Effect of density and pressure—Calculation of resistance—Slipstream—Effect of inflow on resistance of pusher body—Tail-plane and miscellaneous.

PART II—STABILITY AND CONTROL

Centres of Pressure and Moments: Centre of pressure—Moment coefficient—Longitudinal and normal forces—Forces on upper and lower planes—Moment coefficient of biplane—Experimental results—Body moments. *Tail-planes and Downwash*: Tail sections and normal forces—Tail efficiency—Downwash—Airscrew downwash—Model experiments—Full-scale experiments—Tail settings. *Mathematical Discussion of Stability*: Definition—General analysis—Separation of longitudinal and lateral motion—Mathematical conditions of stability. *Longitudinal Stability*: Equation of stability—Calculation of derivations—Numerical approximations—Phugoids—Pros and cons of longitudinal stability—Rough rule for longitudinal stability—Numerical example. *Lateral Stability*: Equation of stability—Calculation of derivatives—Design of fins—Dihedral angle—Numerical approximations—Types of instability. *Controllability*: Use of controls—Steeply banked turns—Lateral control—Hinge moments—Experimental results—Elevators—Ailerons—Rudders—Balanced controls—Vertical dive—Loops—Experimental data at unusual angles—Spins. *Appendix on Methods of Testing. Glossary.*

The book is published by the Norman W. Henley Publishing Co., New York, and is obtainable through the Aeronautic Library, Inc., 299 Madison Avenue, New York. Price, $12.50.

Personal Pars

R. R. Zimmer has joined du Pont Motors, Inc., Wilmington, Del., in the capacity of chief engineer, and will be in charge of the new du Pont automobile, which is now expected to be on the market about June 1. Zimmer has been designing engineer of the Simplex Automobile Co., and the Wright-Martin Aeronautical Motors Co. Back in 1904 he was associated with the Crane Motor Car Co. as designer.

DISTRIBUTE THE VICTORY MEDALS

The Government has completed final arrangements for the issue of the Victory Medal to all those entitled to it who served in the World War between April 6, 1917, and Armistice Day, November 11, 1918. The medals will be issued gratis. The distribution of medals to the army commenced June 21, 1920.

This medal, of beautifully toned bronze, was designed by the celebrated American sculptor, James Earle Fraser of New York, under the supervision of the Commission of Fine Arts.

In addition to the medal there have been designed thirteen combat or major operation clasps and a defensive sector clasp which go on the ribbon with the medal, and also five oversea service clasps for troops not entitled to battle clasps.

The following is a list of the battle and service clasps. These are arranged in order of date of engagement and service.

Cambrai, between May 12 and December 4, 1917; Somme Defensive, between March 21 and April 6, 1918; Lys, between April 9 and April 27, 1918; Aisne, on the Chemin des Dames and northeast of Rheims, between May 27 and June 5, 1918; Montdidier-Noyon, between June 9 and 13, 1918; Champagne-Marne, between July 15 and 18, 1918; Aisne-Marne, between July 18 and August 6, 1918; Somme Offensive, between August 8 and November 11, 1918; Oise-Aisne, between August 18 and November 11, 1918; Ypres-Lys, between August 19 and November 11, 1918; St. Mihiel, between September 12 and 16, 1918; Meuse-Argonne, between September 26 and November 11, 1918; Vittorio-Veneto (Italy), between October 24 and November 4, 1918; Defensive Sector (for service in defensive sectors as distinguished from major operations in European and Siberian service); France,* between April 6, 1917, and November 11, 1918; Italy,* between April 6, 1917, and November 11, 1918; Siberia,* for any service; Russia,* for any service in European Russia; England,** between April 6, 1917, and November 11, 1918.

Owing to the different classes of medals it has been found necessary to divide them into three phases: 1. A medal assembled without any clasps for troops who served in the United States only, between April 6, 1917, and November 11, 1918. 2. A medal assembled containing one service clasp for troops who served overseas and were not entitled to a battle clasp. 3. A medal assembled carrying the different battle clasps representing each major operation in which a man participated. The battle clasps being set on the ribbon from the top down according to date of battle.

The distribution of this medal will be made by the depot officer of the Quartermaster Corps, Philadelphia, Pa., on authority of orders promulgated by the Adjutant General of the Army on approved applications, and in accordance with the provisions of Section III, Victory Medal Circular. The distribution will begin on June 21 and proceed at the rate of about 35,000 medals per day.

The method of making application for the Victory Medal will be in accordance with Section I, Victory Medal Circular, and briefly will be as follows:

All officers and men will make application on forms prescribed by the Adjutant General of the Army to the nearest post, camp or station, or recruiting officer. If the man lives in a city where there is a recruiting officer, he should carry his application together with original discharge papers to the recruiting officer, who will decide the class of medal and the number of battle clasps to which he is entitled or forward the application for further consideration if not properly supported. The original discharge papers will then be handed back to the man and the depot officer of the Quartermaster Corps, Philadelphia, Pa., ordered to ship the medal direct to the recipient. Should a man not live in a town where there is a post, camp or recruiting station he should apply by mail to the nearest post, camp or station for the necessary blank forms for application and for making the extract of discharge certificate if he does not desire to forward the original with his application. The Victory Medal Circular will also be furnished for his complete direction in making his application. If his discharge papers do not substantiate his claim the application and all supporting papers will be forwarded to the Adjutant General of the Army, where a search of the records of his organization will be made and the exact medal and battle clasp determined. After a man makes application to the nearest post, camp or station he need not communicate further, unless he does not receive his medal from the depot officer of the Quartermaster Corps, Philadelphia, Pa., within a reasonable time.

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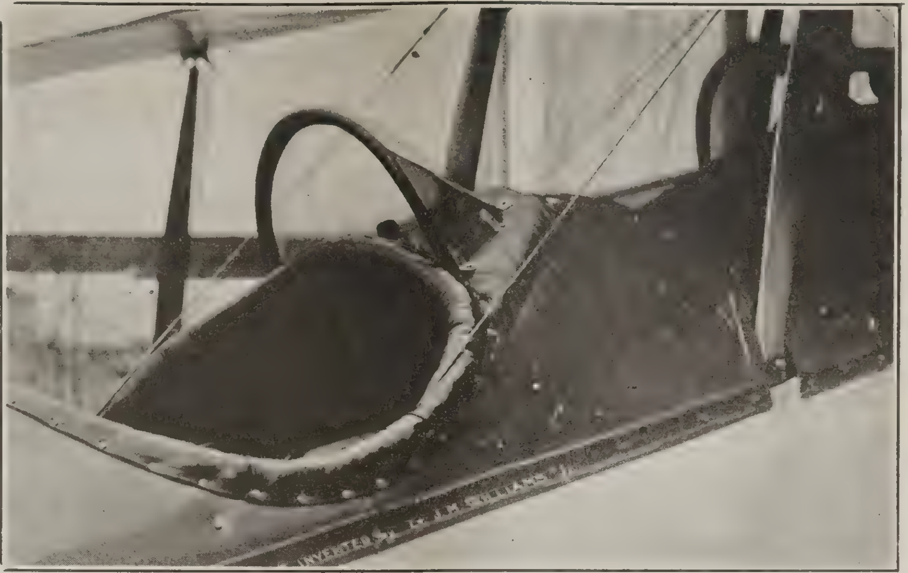
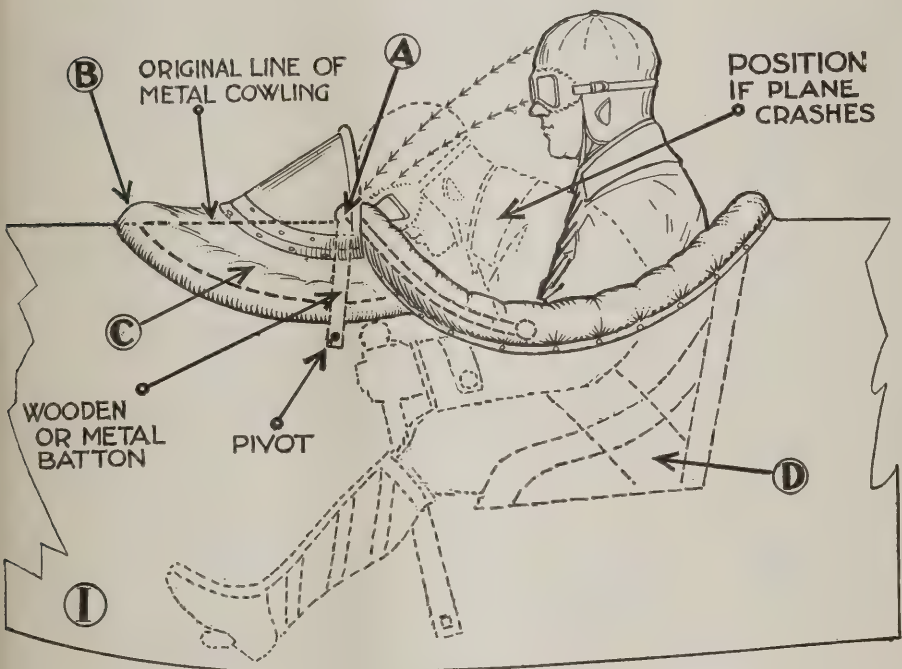
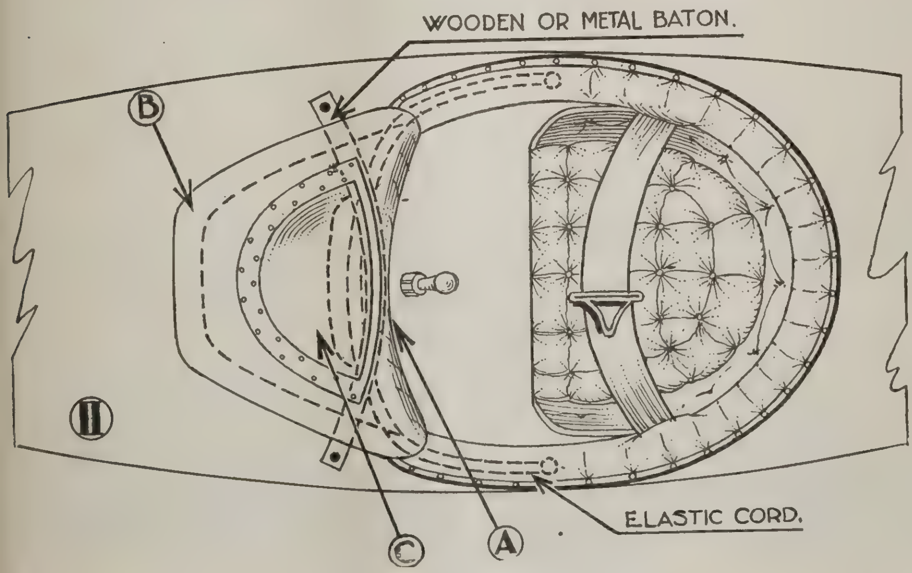
* For service not entitling them to battle clasps or defensive sector clasp.

** Where service was in England only.

NEW SAFETY COWLING DESIGNED TO ELIMINATE INJURY TO FACE







A new safety cowling has been designed to lesssen or eliminate injury to the pilot's face in the event of a crash. In practically every wreck that occurs, the pilot's face is thrown forward due to sudden stoppage of plane, and with the conventional construction of cowling or deck in front of him, even with the padding around edge of same, injuries to the face result of a more or less serious nature, such as broken nose, jaws, etc. In fact, in the minor crashes, the pilot and passenger often escape without any other injuries but these. Some planes are constructed with a cowling entirely cut away in front of the pilot so that there is no obstruction between him and the instrument board. This not only results in poor streamlining of fuselage but the air currents blow in cock pit. The most serious objection is that in case of crash, the pilot's head will continue forward and strike joystick or instrument board with even more serious results than by hitting the present cowling.

In Figure 1 is shown the device as fitted to Curtiss Training Plane. The original line of cowling is cut away in a U-shaped opening in front of the pilot's head and same is fitted with a flexible elastic and leather material marked "U" in the drawing. The padding around the original cowling edge is retained and also fitted with an elastic about the size used for shock absorbers, as well as a small wooden batting. This gives a certain amount of rigidity in order to hold its shape yet due to the yielding nature of elastic and leather covering which will absorb a tremendous blow without any injury whatever to the pilot's face. In Figure 2 is shown a top view of same giving idea of proportions used, the U-shaped opening being marked "U," padding marked by letter "P."

The celluloid windshield shown in Figure 1, has edge protected by a leather padding.

All the ships used at one of the Texas Flying Fields were equipped with the device shown, with more satisfactory results and it is the subject of a report by U. S. Army Flight Surgeons highly recommending same and suggesting that all future ships be so equipped.

The device was designed by Lieut. John M. Williams, Jr., of 135 Montclair Ave., Montclair, N. J.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages. AERIAL AGE *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in AERIAL AGE *for February 9th and 16th and by Mr. Hughes in his 1918 investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Mr. STEINBRINK. Approved May 28; May 16 Mr. Fisk testified he was forced out through circumstances that he, using his one phrase, was very much disappointed at; that on May 18 the railroad contract was entered into and the route was left open; that about June 15 Col. Disque determined the route had to go ahead from the Government; that along toward the middle or latter part of July you made a visit to the West and went over the railroad, as well as the general railroad situation; that on November 11 the armistice was signed. Meanwhile it appears on the record, Mr. Ryan, that you had been a director and officially connected with the Anaconda Copper Co.; that the American International Co., with which you were associated and of which you had been a director, was the owner of the Amsinck Co.; that you were a director of the St. Paul Railroad and one time a member of the executive committee; that the St. Paul Railroad owned the land company which owned 79,000 acres throughout the Clallam County district; that Mr. Donlan, who was a superintendent employed—I beg your pardon; that Mr. Donlan, who became superintendent on this logging work, had at one time had business relations with you with respect to some water power; that Mr. Sawyer, an engineer of the St. Paul Railroad, became chief engineer of this other work, with rather great power under the contract, powers of final determination and decision in event of dispute; that after the completion of the work Mr. Sawyer went back to the St. Paul Railroad; that Col. Disque had never had any logging experience and had come from the superintendency of the prison at Jackson to this work, and that subsequently, when he terminates his connections with the Government, through your introduction to the American International, is made president of the Amsinck Co. at a salary of $30,000 a year; that Mr. Kelley, who was attorney for the Anaconda Co., helped revise and prepare the second spruce contract; that Earling, superintendent of the Milwaukee Railroad, urged the finishing of 14 miles of the road on November 14, three days after the armistice had been signed, in a telegram from Col. Stearns, which is quoted in full in the record; that Mr. Byram, president of the Milwaukee road, was one of those at the conference with Col. Disque at which Col. Disque said he finally made up his mind on the location of this road; that after all these facts are before the committee it appears from the Government record that the cost of railroad construction in this region was $8,700,000, and that the estimated salvage on that was $750,000, which you yesterday said, to your mind, was very low——

Mr. RYAN. And said that, of course, it was an estimate, and not the realization.

Mr. STEINBRINK. Now, those are the facts, Mr. Ryan, with which I was confronted; and it seems to me that with those facts standing cut, there was an explanation necessary. Whether or not you have made the explanation is not for me to say.

It is fair to Mr. Ryan to say he claimed to have no interest in any of the Siems-Carey logging or railroad operations, or in the plans of the Milwaukee road. Important testimony is therefore submitted.

A brief review of evidence before the committee regarding the Siems-Carey-Kerbaugh Corporation cost-plus operations, and Director Ryan's relations thereto, is set forth in the hearings. Portions of such review are submitted herewith, giving pages of the record where the evidence can be found (pp. 3159-3164):

Rival Railways Trying to Control Territory

Evidence before the committee concerning the $4,000,000 "spruce" railroad tended to show that officers of the Port Angeles & Grays Harbor Railroad Co. had secured certain rights of way over what is known as the "Crescent Lake Route" from Port Angeles to the Hoh River, a point about midway between Port Angeles and Grays Harbor. That this new road proposed to connect up with a transcontinental road from Grays Harbor, and between those points it would become a competitor of the Milwaukee Railway. The Milwaukee had built from Port Angeles westward to Deep Creek, about 40 miles, and thence surveyed to Grays Harbor over what is known as the Pysht Creek route. The Milwaukee road over Pysht Pass on the Pysht Route and the P. A. & G. H. Railway through Muellers Pass over the Crescent Lake Route, according to the testimony, controlled the only two passes over the mountains between these terminals. These two passes were vital to the extension of any road between Port Angeles and Grays Harbor. From twenty to thirty billion feet of growing timber between these terminals promised an abundant freight haul for over 50 years to come to the railroad that secured control.

In hearings at Seattle and subsequent testimony, Mr. Calkins, vice-president of the Milwaukee road, is alleged to have offered to have the Milwaukee Railway take over the rights of the P. A. & G. H. Railway and build it as a part of the Milwaukee system. This offer was refused (pp. 1102, 2865).

The P. A. & G. H. Railway had arranged in 1917 for $3,500,000 and was to be financed by English capital through F. A. Douty, a Portland lumberman working with the English Government (pp. 2229-2240). Disque, an inexperienced Cavalry captain, was selected for unexplained reasons to take charge of spruce production on the coast and was sent West about October 15, 1917. On December 10 Disque wired Maj. Leadbetter, Washington (p. 2230), opposing the Douty plans, and so prevented financing of the P. A. & G. H. Railway, according to the claims of its promoters.

When the $23,000,000 Carey spruce contract dated April 12 was signed in Portland, Disque claimed he would not approve it until he had decided where a railway to get out the spruce should be located.

Three Ways to Get Out the Spruce

Three ways were open for getting out the spruce covered by the $23,000,000 spruce contract. First, by a 15-mile road which would tap the spruce up the Hoko River, thence rafted from Clallam Bay to mills, as in British Columbia spruce operations. This road in ordinary times could be built for $250,000. This route was strongly urged by the Government logging engineer and other loggers upon Disque, with promise of active logging operations in three months' time if adopted (p. 2895).

A second route to the spruce timber was the Pysht route through an extension of the Milwaukee road, which was approved by the Secretary of War April 24. This route required building about 25 miles of additional railroad, and thereafter logs would be hauled over the Milwaukee Railway.

The third route to the spruce timber, and the one selected, joined the Milwaukee line about 20 miles west of Port Angeles at Joyce, and thence by two tunnels and several deep cuts struck the surveyed line of the P. A. & G. H. Railway, near Lake Crescent, at Muellers Pass, and, according to contentions of railway promoters, it thereafter appropriated their surveys, making a total new extension of 36 miles from Joyce on the Milwaukee road.

In any proposed extension of the Milwaukee Railroad by this last line the distance between Port Angeles and Grays Harbor would be materially shortened, although at higher cost of construction.

The third route was the one decided upon by Col. Disque, and the Siems-Carey-Kerbaugh Corporation constructed the 36 miles of railroad from Joyce to the spruce timber, near Lake Pleasant, over what is known as the "Lake Crescent route."

The Seims-Carey-Kerbaugh Road Cost Ten Times Too Much

Carey's corporation built this 36-mile road over a 1,100-foot divide (p. 93) at a cost to the Government of about $4,000,000, or $110,000 per mile, including sidetracks (p. 1593), with a total 80-mile rail haul to water before rafting. According to experienced loggers and reputable witnesses the road was improperly located, did not reach any spruce for 30 miles and cost ten times what a properly located and properly built road to reach the big spruce tract ought to have cost. This Carey logging "road was built through cuts in the solid rock 150 feet in height above the rails." Two tunnels were built to prevent slides along Lake Crescent. Of the bridges Maj. Ray's report says (see VIII, p. 7):

> Pile bridges were constructed almost 100 feet high, the highest unframed pile construction in the United States. One bridge was built almost 200 feet in height.

The Port Angeles & Grays Harbor Railroad, heretofore mentioned, had made careful estimates for building a commercial line around Crescent Lake on the south side with an average cost of $22,056 per mile (p. 2879) and it passed through the same large spruce section near Lake Pleasant on its way toward Grays Harbor.

A 15-mile railroad from Clallam Bay, up the Hoko River, as stated, would go through 10 miles of spruce timber and then reach the same Lake Pleasant large spruce tract only 14 or 15 miles distant from Clallam Bay. Engineer Frost, a large logger, testified that this 15-mile road could have been built in 1918 for $21,375 a mile (p. 824). He had estimated it carefully. Engineer Thompson testified that in 1915 this 15-mile road could have been built for $16,000 per mile (p. 823).

(*To be continued*)

NAVAL *and* MILITARY AERONAUTICS

9th Observation Squadron to Patrol Forests in California

Due to the depleted personnel and the small number of organizations available for this work there will be but one Squadron for forest fire patrol this year. This Squadron which is the 9th Observation, will patrol the forests in California only. The headquarters of the Squadron will be Mather Field and from there operations will be carried on over the various forest reserves in California.

The Air Service recently completed a course of instruction for civilian foresters of the Agricultural Department at March Field. This course gave training to the foresters in the work of aerial observation, pertaining particularly to forest fires and also enough instruction in the means of communication to permit these men to act as observers on the patrols instead of commissioned Air Service observers.

Aeroplanes used will be De Haviland 4 B's and they will be equipped, either with wireless telegraph or telephone sets and the various stations equipped with the necessary receiving outfits.

Naval Reserve Flying Corps of 2,000

The Navy Department has decided that the Naval Reserve Flying Corps (Class 5) will consist of approximately 2,000 officers, all of whom must be qualified naval aviators. In order to obtain and maintain the officers the following plan has been adopted: The required percentage of graduates of designated universities and colleges, who have completed a syllabus of training in aviation approved by the Navy Department, and who meet all other requirements defined by the Navy Department, will be enrolled in the Flying Corps as midshipmen. They will immediately be sent to Pensacola, or other naval air stations, for an intensive course of training for three months or longer. Upon completion of the course graduates will be commissioned either as ensigns in Class 5 or will be discharged, according to whether or not they are considered qualified for all the duties of an officer in the Flying Corps. Every officer in the Flying Corps will be confirmed in appointment after graduation and thereafter will be required to take at least two weeks' active duty for training at a naval air station or with a fleet aviation detachment each year.

Facilities will be open at all times to officers of the Flying Corps at all naval air stations to engage in flights at their own convenience. In order to remain in the Flying Corps each officer must have at least fifteen hours' actual time in the air each year of his enrollment. There are approximately 1,500 qualified aviators in the Naval Reserve Flying Corps. An officer in the corps will not be re-enrolled after he has had eight years' service; therefore, in order to provide and maintain the necessary number it will be necessary to enroll and train about 400 midshipmen every year. Only officers now in Class 5 who are qualified naval aviators and have had less than eight years' naval service will be eligible for re-enrollment. Enrolled enlisted men will not be eligible for enrollment in this class.

New Aeroplane Ambulance for Army

The construction of aëroplane ambulances, a new design of which was recently completed at the Air Service Experimental Station, McCook Field, Dayton, Ohio, and flown to Bolling Field at Washington, has been started.

The new ambulance has a fuselage designed primarily for the transportation of the sick or wounded providing space for two litter patients, a medical attendant and a pilot.

The basis for this new ambulance is the DH-4 aeroplane, with several modifications. The landing gear has been moved forward about twelve inches and the dihedral angle increased to 2.75%. The wings have a 12-inch stagger and the angle of incidence is 3°.

Necessary accommodations for the wounded are provided by increasing the depth of the fuselage behind the pilot's seat and dividing the space thus provided into an upper and lower compartment by means of a longitudinal partition. These compartments are reached through doors running their entire length opening on the side of the fuselage. Each compartment is furnished with a Stokes litter which can be securely fastened in its compartment and is easily handled by two men. Adequate light and ventilation is provided by means of windows in each compartment.

Aviators Discover New Lake in Panama

Two planes from the 7th Aero Squadron recently made a reconnaissance flight to locate a lake reported in the mountains north of Anton, R. P. The planes located this lake about fifteen miles west of Chame Bay and eight miles from the Pacific Coast. It is not shown on any maps and is the first fresh water lake to be found in Panama.

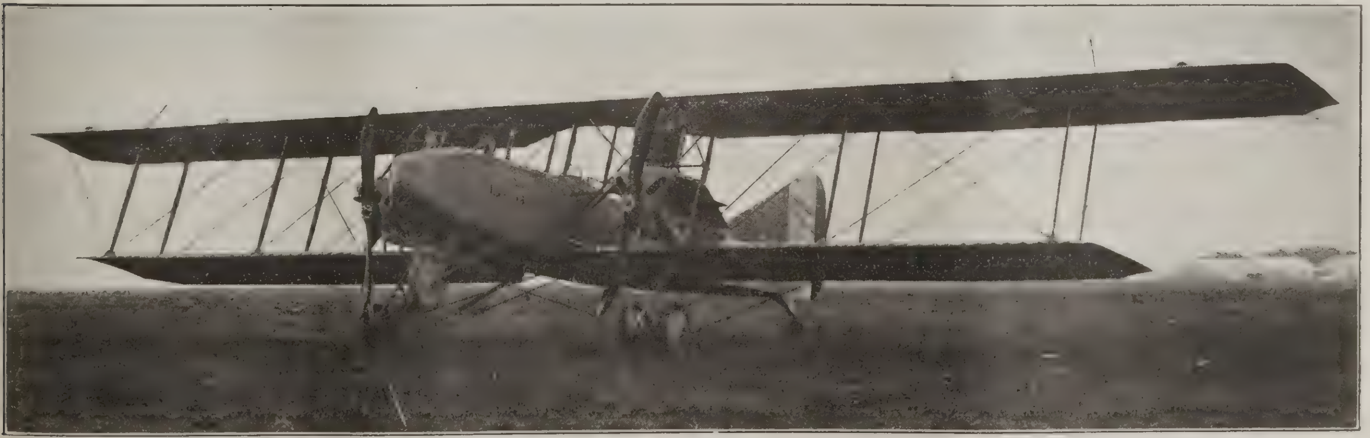
Photographic Lens Dropped from the Air

Recently the radio officer of the 1st Bombardment Group on recruiting duty at Gonzales, Texas, sent a radio call to Kelly Field requesting that a projection lens for their moving picture machine be dispatched to them. It was learned that the nearest place that a lens could be secured was at Dallas, a distance of 250 miles. Accordingly Lieut. H. H. Spencer flew to Dallas in a DH-4B, secured the lens and returned to Kelly Field, having completed the flight of 500 miles in five hours. From Kelly Field to Gonzales, a distance of 90 miles, was flown by Lieut. Drum. Arriving at Gonzales it was found that there was no aviation landing field there. The Observer wrapped the lens in cloth and paper and dropped it from the aeroplane to the men waiting below. It landed safely in the hands of an enlisted man.

Sergt. Bottriell Sets Parachute Record

Dayton, Ohio.—Sergeant Bottriell of McCook Field, recently made a record parachute descent from an aeroplane at 19,500 feet. The aeroplane, piloted by Sergeant Madan, climbed to an altitude marked by the indicator as 19,500 feet. Bottriell climbed out on the fuselage to make his jump. The wind caught his parachute and pulled him through the tail of the machine, tearing the rudder. He bruised the muscles of his arm and strained the ligaments.

Bottriell landed safely near Germantown, ten miles west of here, with his parachute ripped where it had been in contact with the tail wires of the plane.



A French Letord Type L1—, three place observation aeroplane, equipped with two 150 H.P. Hispano-Suiza engines

FOREIGN NEWS

Six Vickers-Vimy Commercial Machines for Transport Service

S. Instone and Co., the well-known shipping agents, who for some months have been running a D.H.4a as a passenger service machine, have also recently acquired a Bristol Tourer. Now one learns that an order has been placed for six Vickers-Vimy commercial machines. The first of this series has been delivered.

The company intend putting it on service immediately, and the fare to Paris has been reduced to £12 single and £21 return.

This magnificently equipped and fitted Vickers "Vimy" commercial biplane (Rolls-Royce engines) was tested at Brooklands recently by Capts. Cockerell and Broome. It will be employed on the London-Paris service. It is named "The City of London." The passenger seats are beautifully upholstered, and there are sliding Triplex windows.

The pilots enter the fuselage by means of a door which is situated aft of the passenger cabin, and reach their cockpit by means of a passage through the saloon. There are many refinements on the machine, including three-ply covering on the leading edge of the lower wings, where the mechanic steps in order to repair the engines, and footboards to render the starting up of the engines a more comfortable job. The engine cowling is also improved so that the engines may be more easily removed or attended to.

This machine behaved almost perfectly on test, carrying a full load and attaining a speed of 110 m.p.h., which is the speed now obtained from all the new "Vimys."

The Vickers works at Weybridge are very busily employed on the production of the machines for China, many of which are being packed for shipping.

The new "Viking" amphibian will most probably have been given its first test flight by the time these notes appear. Great things are expected of it, as many improvements have been made. It is hoped that 110 m.p.h. will be the top speed. The "Viking" has accommodation for a pilot and four passengers, with an additional 300 lb. dead weight. It has a petrol capacity equal to a five hours' flight. The retractable undercarriage has been improved, and will stand up to the roughest surface. The engine is an "Eagle" Rolls-Royce. The machine is intended for commercial work, and possibly mail-carrying.

A new twin-engine Vickers-Saunders flying-boat will be completed shortly.

To Deliver Bees by Air in Canada

The Aero Club of Canada has been asked to assist in a very novel enterprise. The owner of large apiaries in Ontario is seeking to arrange for aeroplanes to obtain an importation of bees from the Southern States. It is expected that a large number of bees will be imported into Canada for next year, and the Canadian breeders are anxious not to get a strain which might weaken during the winter months. It is therefore important that the bees arrive in Canada at the right moment next spring and without any loss of time. This is where the speed of the aeroplane is to be turned to account. It is probable that the first cargo of bees to be carried by aeroplane will be by Canadian airmen for Canadian apiaries. It is proposed also that these flights be used to test the practicability of delivering bee breeders' supplies by air.

Lieut. Roget Begins Around Europe Trip

Paris.—Lieutenant Henri Roget, the French ace who recently completed a round trip flight across the Mediterranean, took the air recently in an attempt to make a non-stop flight from Paris to Warsaw.

This journey is the first leg of an "around Europe" trip, Lieutenant Roget's itinerary being Paris, Warsaw, Bucharest, Constantinople, Athens, Rome and Paris. He expects to make the trip in seven days.

Super-Zeppelin Surrendered

The German Zeppelin airship L 71, said to be the latest and largest of her class, will arrive at Pulham, England, the Norfolk air station, shortly. She has been handed over in accordance with the terms of the peace treaty and is the property of Great Britain.

This airship, which will be navigated from Germany by a mixed crew of British and Germans, is the most wonderful in the world. Her flying radius is 12,000 miles, or over three times the distance between London and New York. She is a quarter as large again as the airships of our R 33 class, and has double their engine power. Her flying speed is said to be about 100 miles per hour.

The great aerial warship was coveted by all the Allies. She was built for bombing New York and other cities on the Atlantic side of the United States. America is to have another Zeppelin, rather smaller than the L 71, and Captain Max Jield, who is training a picked crew of American airmen at Howden aerodrome in Yorkshire, will probably go to Germany to take charge of her.

Will Hunt With Planes

Business men at Aalesund, north of Bergen, Norway, intend, during the coming summer, to use seaplanes for seal and whale hunting in Denmark strait, between Iceland and Greenland, says the National Tidende. The first of these machines will probably be sent up in the course of a week or so. Many ships already are in the strait.

Traffic on French Air Routes

During the first quarter of this year, 47 journeys have been made between Toulouse and Rabat, and 40 passengers have been conveyed as well as 100 kilos of letters and 432 kilos of goods. On the Toulouse-Bordeaux line there have been 62 journeys, and 20 passengers have been conveyed.

Potez Biplane Makes Good Flight

The all-metal Henry Potez biplane, which attracted much attention at the Paris Salon, has recently been undergoing tests, and has proved most satisfactory. Piloted by Douchez, the machine, after manuvering over Le Bourget aerodrome, made a remarkable landing at a very reduced speed, coming to a standstill in 10 metres. The Potez biplane has a fixed 50 horsepower engine of four cylinders.

Italian Aviation Fixtures

Aviation will be much to the fore in Italy during the coming autumn. In addition to the Schneider Cup Contest, which is to take place at Venice on August 28 and 29, there will be a "Seaplane Week" on Lake Guarda early in September. Also, the Turin Aero Exposition, which was to have been held in May, has been postponed to October. The Aviation Week, arranged to take place at Brescia in September has, however, been put off till next spring.

A Swedish Record

Lieut. G. von Segebaden is reported to have lowered the Scandinavian height record recently with an altitude of 6,200 metres in 48 minutes As he carried no oxygen he thought it wise to finish his trip when he had recorded 28 per cent. of frost.

Seaplanes Classed as Ships in France

It should be noted that seaplanes entering a port are classed as ships. Seaplanes going from England to France must therefore land at Dunkirk, Calais, Boulogne, Treport, Dieppe, Havre, Caen, Cherbourg, or Saint-Malo for customs examination.

Brazilian Navy Gets Four Aeromarine Flying Boats from U. S. Navy

The Secretary of the Brazilian navy has ordered from the U. S. Navy Department four aeromarine Model 40 flying boats, with spare parts, and two extra Curtiss OXX-6 engines of 100 horsepower each.

New British Aeroplane Carrier

The new British aeroplane carrier Hermes, laid down in January, 1918, and which is to go into commission this year, embodies many important war lessons. She is a speedy craft and will do twenty-six knots, has a length of 548 feet and 70 feet beam with a displacement of 10,950 tons. Her whole length of the flying deck will be available for starting and landing the planes, and, by special arrangements for the emission of hot gases and smoke, there will be no funnels or other obstructions. Under the flying deck are the hangars for the planes, as well as the workshops for their repair. Two electrically-controlled lifts are fitted, the one forward and the other aft, for hoisting the planes to the flying deck. Another special feature of her design is a system of ventilation to lessen the danger of fire from petrol fumes. The armament of the Hermes will consist of a numbr of light guns for anti-aircraft protection and several 6-inch guns for heavier work. In her construction as a defense against torpedo attack the "blister" system has been used. The complement of the vessel will comprise 500 navy men and 130 members of the Royal Air Force.

China to Have Aerial Mail

China is responding to the call of the air and an aerial mail service will be established between Shanghai and Pekin within the next few months if the plans of Gen. Kinn, director of the Department of Aeronautics, are carried out. An extension of the mail service will be from Pekin to Urga.

The plan is really comprehensive. Forty Vickers machines have already arrived. Sixty more have been contracted for. Chinese aspirants to flying fame will be trained both at home and abroad and foreign technical experts will be engaged until the Chinese feel competent to take over the service.

Straphanging in the Air

During the recent trip of the Vickers-Vimy owned by S. Instone and Co. to Amsterdam, it was found that there was an enormous demand for joy-rides in this splendidly fitted-up machine. Owing to pressure of time, more people than those for whom seating accommodation was provided had to be accommodated.

Consequently the novel spectacle of "straphangers" was to be seen. Extra passengers stood in the gangway between the seats.

A Progressive Dutch Policy

Holland has bought all the French aircraft which was interned during hostilities, and also a large number of the German machines landed in Holland under similar circumstances. It is anticipated by the German aircraft industry that Dutch orders will be obtained by it in preference to supplies being secured from America, U. S. A. manufacturers having already been turned down when offering some hydroplanes. On the other hand, several officers of the Dutch Indies Army are making technical studies at Vickers' factories in this country, and a Committee is preparing for the establishment of Vickers' factories in Holland, as well as in the Dutch overseas possessions, and for the delivery of machines there. Aeroplanes and seaplanes are needed for military operations in the Dutch Indies, and they have been ordered from the Vickers' works. The Dutch Government will subsidize a factory to be erected at Amsterdam by Fokker. The Dutch Government further proposes to establish an aerial mail service between Rotterdam and the Zeeland Islands; while another route under consideration is one from Holland to the Dutch East Indian Colonies.

Another aspect of commercial aviation is brought out by the summer programme of the Aircraft Transport and Travel Company, which makes a trip on Mondays, Wednesdays, and Fridays from London to Amsterdam, the Hague, and Rotterdam. Fifteen guineas per passenger is the fare, and the time taken is 2 hours 45 minutes, against 21 hours train and boat service. The London-Paris journey twice daily occupies 2¼ hours against 9 hours by boat and train service.

Spanish Air Lines Fixed

Madrid.—Royal decrees issued recently order the establishment of areial lines between Barcelona and Palma, Majorca, Barcelona, Malaga and Melilla, Morocco, and between Seville and Tetuan and El Armsh, Morocco.

A South African Aerial Mail

The news of a big mail-carrying venture has just been announced in Johannesburg, and the fact that a considerable sum of money has already been put up for it raises it from the standing of a speculation, depending on a whole lot of problematical considerations, the principal one being the reliance on the public for the supply of capital.

The scheme comprises an overnight delivery of letters and parcels between Capetown and Johannesburg at ordinary postal rates, and corresponding services between Capetown and Durban via the coast towns; Durban to Johannesburg via Maritzburg, Dundee, Volksrust and Standerton; East London to Johannesburg via Bloemfontein, and Durban to Kimberley via Bloemfontein.

Captain Kelly is at present in Johannesburg endeavoring, on behalf of the English promoters of the scheme, to convince the commercial community that the project is a sound and commercial one.

ELEMENTARY AERONAUTICS and MODEL NOTES

By John F. McMahon

CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB
921 Ravenna Boulevard, Seattle, Wash.
BAY RIDGE MODEL CLUB
8730 Ridge Boulevard, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE CLUB
Bloomington, Indiana
BROADWAY MODEL AERO CLUB
931 North Broadway, Baltimore, Md.
TRIANGLE MODEL AERO CLUB
Baltimore, Md.
NEBRASKA MODEL AERO CLUB
Lincoln, Nebraska
BUFFALO AERO SCIENCE CLUB
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THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicago, Ill.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bldg., Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB
455 Murray Ave., Milwaukee, Wis.
CONCORD MODEL AERO CLUB
c/o Edward P. Warner, Concord, Mass.
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Oxford, Pa.
CAPITOL MODEL AERO CLUB
1726 M Street, N. W. Washington, D. C.
AERO SCIENCE CLUB OF AMERICA
Beach Bldg., E. 23rd St., N. Y. City
AERO CLUB OF LANE TECHNICAL HIGH SCHOOL
Sedgwick & Division Streets, Chicago, Ill.

A Model for the Compressed Air Plant

IN last week's issue of AERIAL AGE I told about a steam engine plant and previous to that, about a compressed air plant.

These two articles have evidently been received with interest by most model builders, especially the compressed air plant, of which many readers have written to me.

Most of those interested ask as to the best model to build for a compressed air plant.

To this question I would say without hesitation the racing type of model which is easiest to balance and flies with the least resistance and consequently needs less power. The racing model as most readers know consists of a frame to hold the plant which is simply two ½ x ¼" strips of spruce running parallel to one another and a space of 3 inches between for about 20 inches when they converge and meet at a point about 12 inches further on. The usual type of featherweight wings are used, such as are found on racing models, and the plant is installed to the rear, the model being a pusher.

This is one type of model and will give the best results.

Another and one that is an exact reproduction to a smaller scale of a large machine is shown in the accompanying drawing. It is copied from the A. B. C. Pusher Biplane, a machine built at the beginning of the war by Vincent Buranelli and John Carisi, model flyers of the old days. The machine was designed to carry two machine guns in front and have a large range for gun fire because of the fact that the gunner and pilot was seated in front, the machine being a pusher.

One can see at a glance how well this model looks with the compressed air plant installed. The tank takes the place of the nacelle and is set between the interplane struts at the center of the wings. Another pair of struts is placed on each side of the body. The upper wing has a span of 42 inches, the chord being 6 inches, the lower plant has only 24-inch spread, the chord being the same. The large machine was designed this way to allow the outer panels of the upper wings to be easily removed and the plane transported along a country road if necessary without dismantling more of the machine.

This design is good for models because of the inherent stability obtained from this combination.

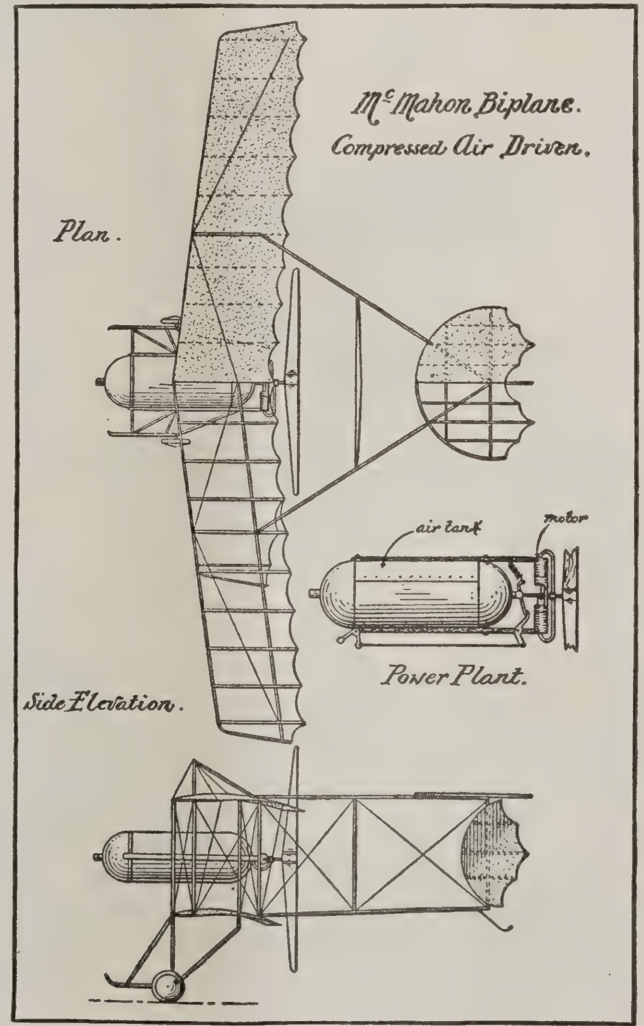
The power plant is shown in the drawing as well. The reader should knot the trigger release for the air cock which was first used in a compressed air model by the writer. Its use provided the model flier with the means of starting the model from the hand without danger of getting the hands caught in the propeller and breaking the blades off or jerking the model so that it would be upset in starting. The valve was held in a closed position by the hook at the rear. The spring on the hook was tending to pull the air cock to the open position. When the trigger was touched by the pressure of a finger the air cock would swing around to the open position and the motor would start running at once.

The model was flown a distance of 200 feet by the writer which is good in view of the fact that the air tank is small and the model is heavy. Then again this was accomplished some 4 or 5 years ago when compressed air motors were known to only a few in this country. The above record could be improved without trouble, today.

The main thing to remember is to save weight wherever possible. The wings should be constructed as follows: For the spars half round 3/16" dowel sticks are best as they are extremely strong. The ribs should be made from strips of bamboo with the trailing edge of wire. The covering is the lightest of China silk doped to pull it up taut and to fill the pores. The outriggers to the tail are also dowels flattened to a streamline shape which is done by planing down the dowel slightly. The interplane struts are streamlined strips of bamboo.

The tail is made in the shape of a half circle and is 12" wide by 8" long. It is built of bamboo and rattan and is double surfaced with china silk. The gap between the planes is 6 inches and the distance between the trailing edge of the upper plane and the leading edge of the tail is 9 inches. The rudder is built up like the tail and measures 5 inches by 4 inches.

Another and later machine that could be copied and built of a compressed air plant is the Continental Pusher KB-1. This machine is also a product of Vincent Buranelli's and the body being of monocoque construction and of round section, could be imitated by the tank shown in the drawing. This machine was shown in AERIAL AGE some time ago.



Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Unto Eternity

They were looking down into the depths of the Grand Canyon.

"Do you know," asked the guide, "that it took millions and millions of years for this great abyss to be carved out?"

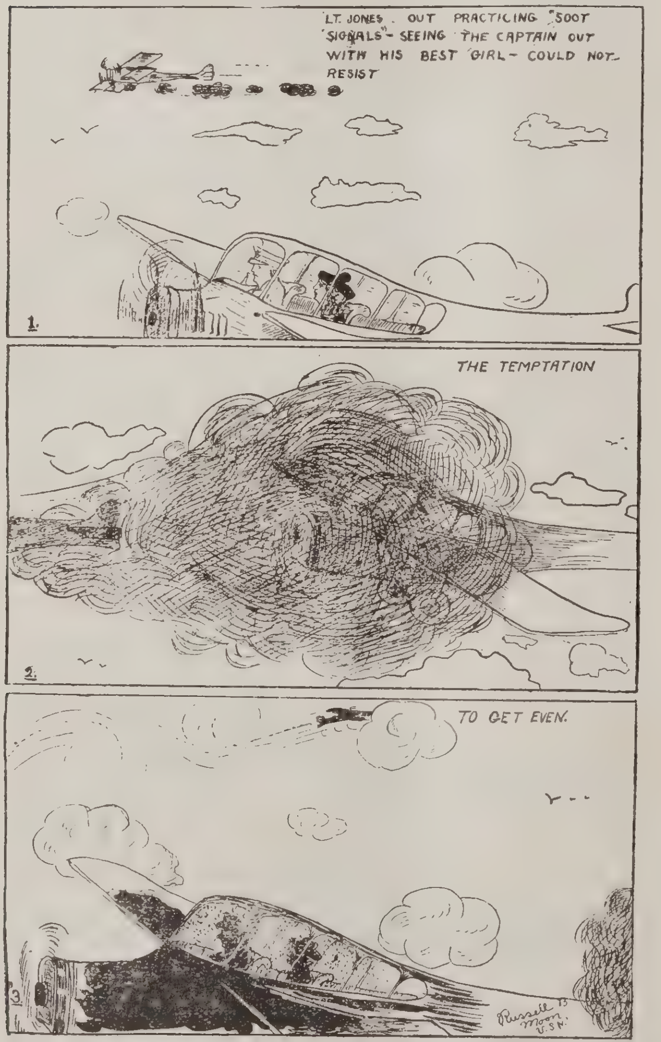
"Well, well," ejaculated the traveler, "I never knew this was a government job."

He Knew

Customer (at post office window): "Give me a two-cent stamp. Say, weren't you in France?"

Clerk: "Sure, I was chief mail clerk for the 111th Division."

Customer: "Never mind the stamp, after all. Guess I'll take this letter round myself."—*American Legion Weekly.*


LT. JONES . OUT PRACTICING "SOOT SIGNALS" - SEEING THE CAPTAIN OUT WITH HIS BEST GIRL - COULD NOT RESIST
1.
THE TEMPTATION
2.
TO GET EVEN.
3.
Russell Moon U.S.N. 13

(*Courtesy, The Naviator*)

He Stunted

There was a young Kewee Lieutenant;
  A wonderful ground flyer, he,
With a fund of remarkable stories
  Of what he had done and would be.

He spoke of his marvelous prowess;
  His records and medals galore.
If you told your sweetheart a story
  He'd enlarge one three times or more.

No matter how fishy he sounded,
  He showed his great cunning and tact;
His stories all had a slight basis—
  A certain foundation on fact.

Now he's got a wild tale to allure you.
  On the highway his Ford took a flip;
They sent out a pilot to hurry
  Him back in the hospital ship.

Say! This one sure cops the Joker,
  The Ace, King, Queen and the Jack
He tells everyone who will listen
  How he flew fifteen miles on his back.

Aint It So?

It takes 20 years for a mother to make a man of her son.
But a pretty Vamp can make a Jackass of him in 20 minutes.

Down The Line

I fell in love with Reggy, dear,
  A quartermaster man, you know;
But then I met Lieutenant Ted,
  And so I let poor Reggy go.

The motor transport's simply great,
  They told me Ted worked on the field,
But, pshaw, I met a Major Jones,
  And so poor Teddy had to yield.

Major Jones! My heart leaps yet,
  That doctor made them keep so clean.
But Jim bobbed up—the Infantry—
  A fighting man—the first I'd seen.

Well, Captain Jim quite won my heart,
  They said he showed them how to drill.
An aviator then appeared—
  Lieutenant White! My heart stood still.

I almost married Billy White,
  He did those loops and spins and twists;
But then I met just Private Joe,
  And soon forgot that White exists.

Just plain old Private Joe, I know,
  Outranked by all those friends of mine;
But, gee, I love him, he's the best,
  With wounds and service stripes divine!

Evansville Journal.

VALENTINE'S
VALSPAR
The Varnish That Won't Turn White

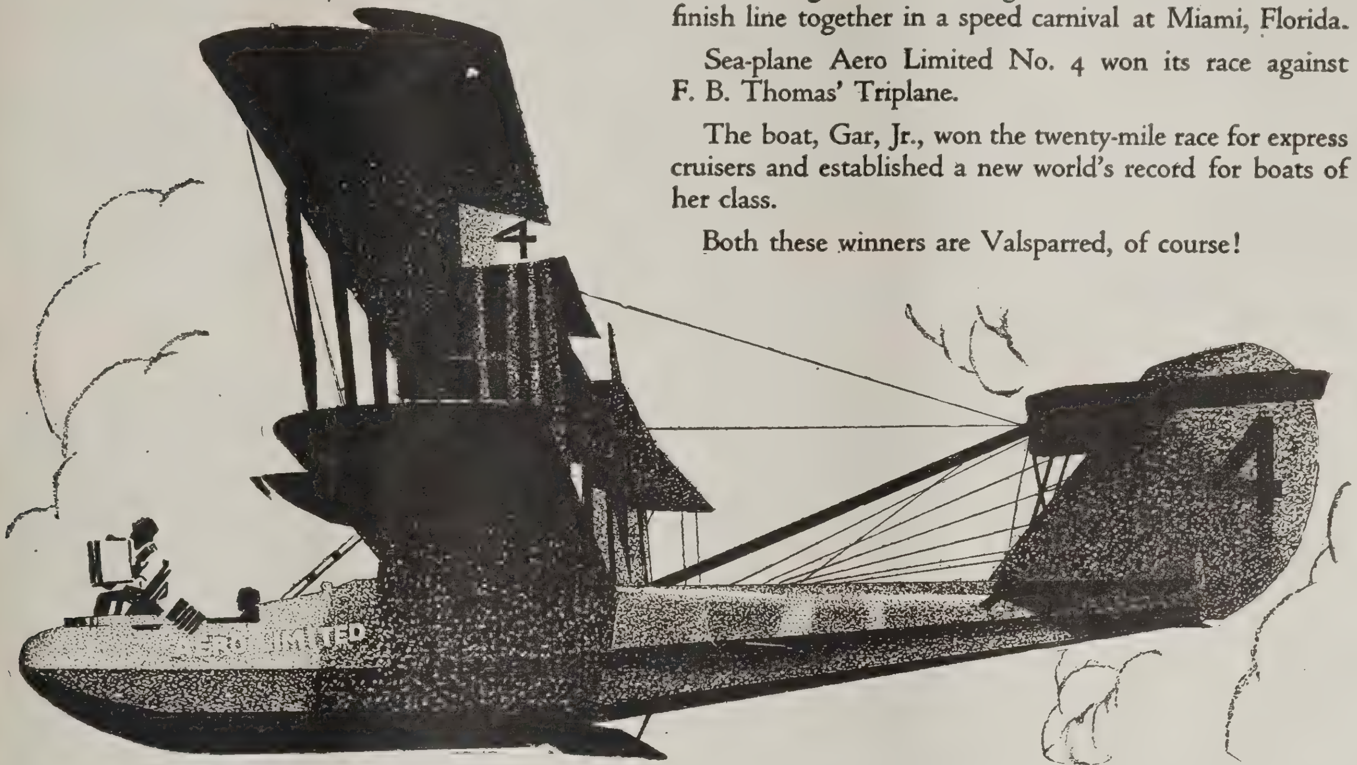
Both winners—
both Valsparred!

A striking bit of luck brought these two winners over the finish line together in a speed carnival at Miami, Florida.

Sea-plane Aero Limited No. 4 won its race against F. B. Thomas' Triplane.

The boat, Gar, Jr., won the twenty-mile race for express cruisers and established a new world's record for boats of her class.

Both these winners are Valsparred, of course!



Wherever there's need of a varnish to stand rough work—to give sure sturdy protection against sun and water, oil and gasoline—there you'll find Valspar, making good on the job.

In the air or on the water, as well as on land, Valspar wins!

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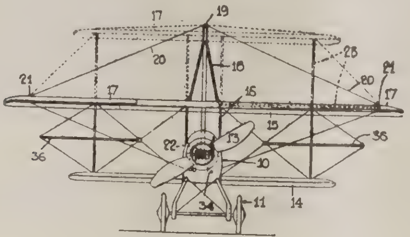
New York Chicago Boston Toronto
London Paris Amsterdam
W. P. FULLER & CO. Pacific Coast

(From Photo by Wide World Photos)

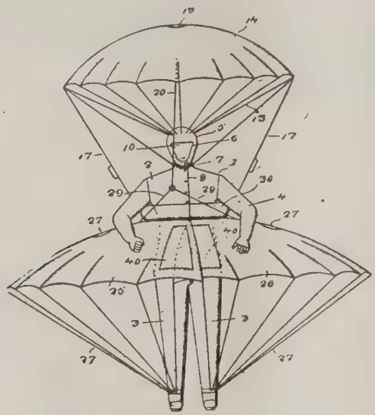
RECENT AREO PATENTS

1,336,406. CONVERTIBLE MULTIPLANE. John P. Tarbox, Garden City, N. Y., assignor to Curtiss Aeroplane and Motor Corporation, a Corporation of New York. Filed Apr. 5, 1918. Serial No. 226,843. 13 Claims. (Cl. 244—12.)



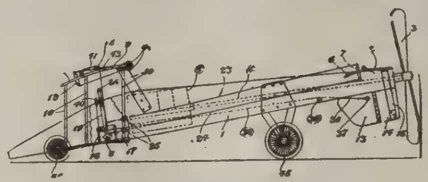
1. An airplane including two supporting surfaces, one of the supporting surfaces being movable into position respectively superimposed upon and superposed with respect to the other, the movable supporting surface comprising separate wings movable toward and away from each other, toward each other as the supporting surfaces are moved into superposed position and away from each other as the supporting surfaces are moved into superimposed position, said wings abutting when the supporting surfaces are superposed whereby to provide a supporting surface continuous from tip to tip.

1,325,108. SAFETY SUIT FOR AVIATORS. William Peterson, Newark, N. J. Filed Feb. 1, 1919. Serial No. 274,489. 2 Claims. (Cl. 244—21.)



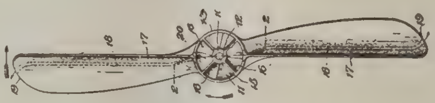
1. Safety means for aviators comprising a close-fitting suit, having legs, arms, and a helmet, with an opening in its front portion, a transparent layer connected to the helmet below the face opening therein, porous material interposed between and connected to said transparent layer and a helmet above the face opening, a parachute adapted, when opened, to rest above the helmet, and, when not in use, to hang from the helmet; the said parachute being connected with the helmet through the medium of guy cables and being provided with an air-escape conduit and a normally closed spring-pressed valve for controlling said conduit, a valve-opening cable extending from said valve to a point on the body of the suit, a buoyant belt carried by the suit and surrounding the waist portion thereof, lower parachute members having their inner portions arranged in lapped relation and connected to the waist portion of the suit, and each having a conduit for the escape of air, and a normally closed spring-pressed valve for closing said conduits, guy cables interposed between the lower parachute members and the lower portion of the suit, and cables connected to the valves of the lower parachute members and extending to points on the suit within convenient reach of the wearer.

1,331,402. AEROPLANE. John Taneyhill, St. Louis, Mo. Filed Feb. 5, 1919. Serial No. 275,073. 4 Claims. (Cl. 244—14.)



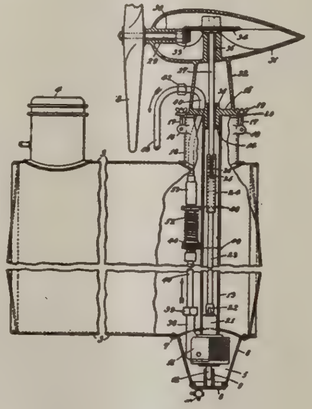
1. An aeroplane, comprising a long body, a single wing having a relatively small supporting surface at the forward end of the body, a pair of wings at the rear end of the body one above the other and having supporting surfaces largely in excess of the supporting surface of the wing at the forward end of the body, ailerons in connection with one of said large wings, mechanism for manipulating and controlling said ailerons, a motor supported by the body between said large wings, and a propeller in front of the small wing driven by said motor.

1,300,552. AEROPLANE PROPELLER. Lester S. Barr, Washington, D. C. Filed May 18, 1918. Serial No. 235,287. 1 Claim. (Cl. 170—172.)



A tractor type aeroplane propeller comprising a central hub, a concentric ring spaced from the hub, a wall joining the rear ends of the hub and ring thereby forming an annular chamber open at the front of the propeller, blades secured to said ring, each blade having an air passage formed therein extending from said chamber to the end of the blade and having its outer opening at the trailing edge of the blade, and blades connecting the front ends of the hub and ring constructed and arranged to effect a circular motion of the air entering the chamber to direct the same to the inner ends of said passages, said blades also acting as reinforcing members.

1,318,732. FUEL SUPPLY PUMP FOR AEROPLANE ENGINES AND THE LIKE. Geoffrey de Havilland and John Stanton Chapman, London, England, assignors to The Aircraft Manufacturing Company, Limited, Westminster, London, England. Filed Aug. 6, 1918. Serial No. 248,509. 7 Claims. (Cl. 103—67.)



1. In an aeroplane or the like, provided with a main fuel supply tank and a carbureter or subsidiary tank, said main tank having a flanged opening, means for transferring fuel from the main tank to the carbureter or subsidiary tank, comprising a pump adapted for drawing fuel from the bottom of said main tank, a discharge pipe leading from the pump to said subsidiary tank and an aeromotor or the like power element for continuously operating said pump while the aeroplane is flying, said pump, the discharge pipe, and said aeromotor being mounted upon and supported by a cover plate adapted to fit said flanged opening, thereby adapting them to be removed as a unit, and means for securing the cover plate to the flanged opening, substantially as described.

AERIAL AGE
WEEKLY

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JUL [illegible]

Airscope of Chicago Showing Municipal Pier

Grand Jury Investigation of M. A. A. Requested

BLISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
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an official announcement will be made of consummation of plans for establishing an

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AERIAL AGE WEEKLY

VOL. XI JULY 12, 1920 NO. 18

TABLE OF CONTENTS

PAGE

Grand Jury Investigation of M. A. A. Requested 607

The News of the Week 609

The Aircraft Trade Review 611

Packard Aero Engine Type 2025 ... 612

Wave Soaring 616

Book Reviews 617

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures 618

Naval and Military Aeronautics ... 619

Foreign News 620

Elementary Aeronautics and Model Notes 621

Aeronitis 622

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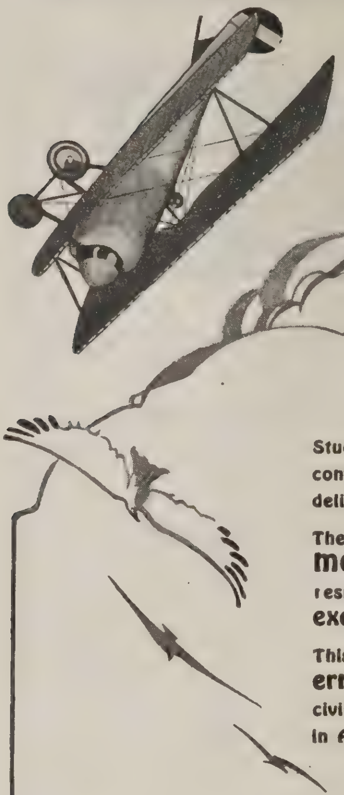

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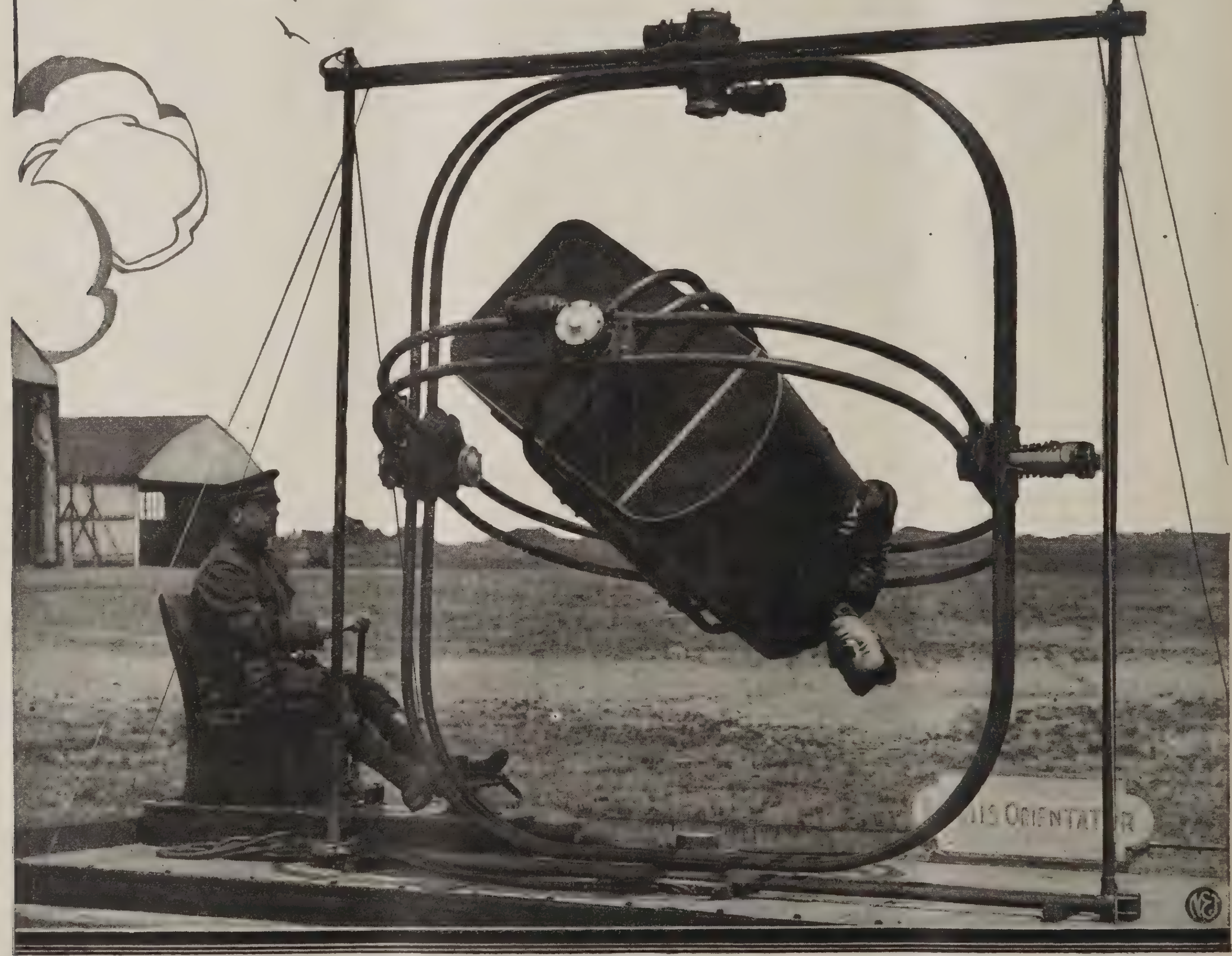
Personnel announced in succeeding issues



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GRAND JURY INVESTIGATION OF M. A. A. REQUESTED

Some of the Facts The Manufacturers Aircraft Association Has Conducted Conspiracies to Suppress are Presented to the Attorney General

THE following letter to the Attorney-General makes public some of the facts of which the Manufacturers Aircraft Association has been afraid and has conducted conspiracies to suppress:

New York, July 6, 1920.

Hon. A. Mitchell Palmer,
Attorney-General,
Department of Justice,
Washington, D. C.

My dear Mr. Palmer:

(1) Through the information supplied by affidavits executed recently by members of the Manufacturers Aircraft Association, which substantiate fully information and evidence already in my possession, I am enabled to submit to the Grand Jury, conclusive evidence that the Government has been made victim of a deep set conspiracy, organized and conducted by agents of the Manufacturers Aircraft Association, through which this Association has obtained large payments of public funds not authorized by Congress.

(2) Agents of the Association also sought to secure support of myself and publications of which I am editor and publisher in a scheme to have aeroplanes which cost approximtely $100,000,000 destroyed, and in schemes to obtain subsidies.

(3) This evidence will, I am confident, enable the Department of Justice to recover large sums of public funds which have been obtained illegally from Government Agencies by the Manufacturers Aircraft Association and by individuals. It will also prevent their obtaining further public funds which they are scheming to obtain at present; and their disposing of illegally obtained public funds now in their possession.

(4) I beg to request that action be taken immediately to institute investigations before the Grand Jury, because the evidence shows that the agents of the Manufacturers Aircraft Association have endeavored by plots, intrigues and conspiracies to discredit, and destroy the sources of income of, the people and organizations who have knowledge and evidence of the Association's conspiracies, through which it obtained the large sums of public funds referred to. I have personally been made the victim of such plots, which these conspirators conducted with part of the public funds obtained by them illegally, as the evidence which I shall present to the Grand Jury will prove.

The first attacks on me were made soon after I was called to Washington early in 1918 by a confidential advisor of President Wilson and Secretary of War Baker to write a report on the aircraft situation, and increased in violence in July, 1918, when I was invited to give advice by the Senate Investigating Committee. They continued since and became especially violent since Congress requested you by resolution to institute investigations before Grand Juries for the purpose of indicting and prosecuting such persons as are guilty of criminal conduct, and to institute civil suits for the recovery of any Government funds which have been fraudulently or illegally paid.

In view of the long-suffering and extensive losses which I have already undergone, I hope you will honor my request to institute Grand Jury investigations and permit me to present my evidence to the Grand Jury without delay.

I am also anxious to present this evidence to the Grand Jury because I feel that it is my duty to do so, owing to the fact that in the discharge of my patriotic duties in the years 1917 and 1918, I was instrumental in causing certain laws to be enacted and certain large appropriations to be made for the building of the Air Forces needed to win the war.

Unfortunately, although approximately one billion and five hundred millions were spent on the aircraft program, comparatively little was achieved before the war was over and the American public will have to pay approximately $60,000-000 annually in taxes for the large sums spent in the aircraft program. Through the evidence which I will supply the Government may get back several millions of dollars of moneys which were illegally and excessively paid.

(5) This evidence which I am ready to submit to the Grand Jury is new.

Neither the Senate Investigating Committees, nor the House of Representatives Investigating Committees, nor the Snowden Marshall Investigating Committee, nor the Hon. Charles E. Hughes, nor Attorney General Gregory had such evidence at the time they investigated the aircraft situation.

(6) While this conspiracy was first organized in 1917, the sums of public funds were obtained by the conspirators in 1918 and 1919, and some were obtained in the past few months.

(7) The attempt to enlist the support of my publications and myself to a scheme to cause the destruction of aeroplanes for which the Government had paid close to $100,000,000 took place soon after the signing of the Armistice.

(8) In fairness to the various Government Agencies victimized by the agents of the Manufacturers Aircraft Association, and of the government bodies which investigated the aircraft situation, it is well to point out that until April, 1920, when the Congressional resolution referred to was adopted requesting and authorizing the Attorney General to act, no Government agency had been authorized to investigate civilian commercial aeronautic bodies and take the legal action necessary to secure refunds of public funds illegally or fraudulently obtained.

(9) Until that time the presentation of evidence to any of the Government investigating bodies only resulted in one becoming the object of attacks and conspiracies conducted by representatives of the Manufacturers Aircraft Association, and paid for with public funds obtained by the Association by the misrepresentations, conspiracies and intrigues already referred to. A person or organization presenting, or known to have, such evidence was "marked for destruction" by the agents of the Manufacturers Aircraft Association and that person or organization would become the victim of most sinister and criminal attacks, plot and intrigues.

Falsehoods of every kind would be circulated by the paid agents of the Association and every scheme possible would be put into effect to destroy the source of income of the person or organization having such evidence.

The expenses of conducting these criminal campaigns were paid for with the public funds obtained illegally by the Association, as the evidence which I shall present to the Grand Jury will show.

(10) When the United States Senate Investigating Committee condemned the Manufacturers Aircraft Association's methods as "vicious and designed to reap large profits by taking advantage of the necessities of the Government", that Committee did not have the evidence available today, proving wrong-doings, conspiracy and misrepresentations and other irregularities and misuse of government agencies, committed by the representatives of the Association to obtain large payments of public funds not authorized by Congress.

This Senate Committee was not, in fact, authorized to investigate civilian agencies such as the Manufacturers Aircraft Association was acknowledged to be when in danger of investigation. At other times its agents claimed for the Association a semi-official status, which they had "manufactured" by schemes and misuse of Government agencies, the details of which will be given in the evidence to be submitted to the Grand Jury.

(11) The material and facts which I am ready to present to the Grand Jury will enable the Grand Jury, I believe, to secure complete evidence to prove several irregularities and violations of statutes by agents of the Manufacturers' Aircraft Association. My evidence is supported by letters and statements from Government officials.

(12) Part of the evidence deals with the following conspiracy:

(a) Early in 1917 the owners of aeroplane patents were consulted and had agreed to sell their patents to the United States Government for reasonable sums which were, however, in excess of the price paid by the British Government for the same patents. For instance, the Wright patents and the Curtiss patents had been sold to the British Government for $75,000 and $20,000, respectively, but over four times that sum was to be paid for the same patents by the American Government. Such were the conditions stated to us by Mr. Howard E. Coffin in the latter part of 1916 and the early part of 1917, when he urged us to start a movement from New York to get Congress to appropriate $1,000,000 for the purpose of buying the important aeroplane patents.

We approved the plan and urged publicly the appropriation of $1,000,000 for the purchase of areoplane patents. The project was submitted to and approved by the Council of National Defense, the Secretary of War and the Secretary of the Navy and was made part of the Naval Appropriation Bill on February 7th, 1917, and adopted as an Act of Congress, reading as follows:

> "To enable the Secretary of War and the Secretary of the Navy to secure by purchase, condemnation, donation or otherwise, such basic patent or patents as they may consider necessary to the manufacture and development of aircraft in the United States and its dependencies for governmental and civil purposes under such regulations as the Secretary of War and the Secretary of the Navy may prescribe, $1,000,000;
>
> "*Provided,* That such an arrangement may be made in relation to the purchase of any basic patent connected with the manufacture and development of aircraft in the United States as in the judgment of the Secretary of War and the Secretary of the Navy will be of the greatest advantage to the Government and to the development of the industry;
>
> "*Provided further,* That in the event there shall be pending in court litigation involving the validity of said patent or patents bond, with good and approved security in an amount sufficient to indemnify the United States, conditioned to repay to the United States the amount paid for said patent or patents in event said patent or patents are finally adjudged invalid."

(b) The evidence shows that immeditely following the enactment by Congress of this law providing for the purchase of aeroplanes patents and the appropriation of the sum of $1,000,000 for that purpose, the representatives of the Aircraft Manufacturers Association, the predecessor of the so-called Manufacturers Aircraft Association, started a conspiracy intended to violate and nullify the purpose of said Act of Congress for the purpose of obtaining for the Association and its members payments of public funds not provided for under, and far in excess to, the sum provided for by the law for aeroplane patents.

(c) Part of the conspiracy also aimed, and eventually succeeded in, avoiding the filing of patent bonds, with suitable securities in an amount sufficient to indemnify the United States in the event that the patents were later adjudged invalid, as required by the Congressional act.

(d) Part of the conspiracy was also to restrict the payment of royalties to two patents, and by trade restraint and other practice in violation to the anti-trust statute to "freeze out" other patent owners and inventors and deprive them of their just due.

In this they also succeeded. As early as August, 1918, the Senate Investigating Committee reported as follows:

> "The Committee had not heard a word in approval of it. It is condemned by every aircraft manufacturer outside of the immediate beneficiaries. Those executing the license agreements have done so under protest because the Aircraft Board recommended or required it.
>
> "Criticisms of it are numerous, the most serious of them being that it subjects manufacturers to onerous requirements by its beneficiaries, such as assessments for the use of plans and specifications, the purchase of materials and accessories from favored houses, and assignments and surrender of valuable patents and patentable devices to the Aircraft Association upon terms prescribed by itself, the discouragement of invention, and the inevitable control of the aircraft industry by that Association or by some other interest through its agency. Your committee sympathizes with many of these sentiments, and notwithstanding the Aircraft Production Board as now officered no longer requires or recommends the execution of the agreement by contractors, we believe the arrangement should be abrogated. We regard it as vicious and as designed to reap large profits by taking advantage of the necessities of the Government. The basic patentees should, of course, if the patents are valid, be compensated, but this should be done by the Government directly whenever the Courts finally decide and determine who the owners are and the patents should then be made free to all manufacturers.
>
> "New patents of meritorious character should be similarly acquired by the Government as they appear. Such a course would stimulate invention and promote the development of an art which is still in its cradle.
>
> "This is not a new departure but rather a reversion to an earlier policy, for Congress in 1917 appropriated $1,000,000 for the purpose of purchasing aircraft patents, which sum is still available, and if insufficient for the purpose it can be easily increased. The Government should never be made the victim of a patent monopoly which it generously created for the sole protection of the inventor against infringement by persons and corporations."

(e) Part of the conspiracy also aimed to take advantage of the conditions created by the ever-changing of personnel in Government Departments to assume privilege for the Manufacturers Aircraft Association to which it was not entitled, so as to obtain public funds to which it was not entitled and,

1. Obligate the Government to continuous payment of public funds;
2. To create a general impression that the Government had acquiesced to the unjudicated patents owned by the Association, which would enable the few members of the Association to throttle the Aeronautic Industry during and after the war, and charge execessive prices for aeroplanes to the discharged aviators after the war—as has happened.

(f) To carry out this conspiracy some of the agents of, and paid by, the Association took advantage of the integrity and unsuspecting nature of the scientists in charge of the National Advisory Committee of Aeronautics, and early in 1917 offered their services and caused themselves to be placed on a special committee to "advise" on patents, and under cover of this committee, they prepared and issued in the name of the National Advisory Committee on Aeronautics, and as a recommendation of the said Committee, a plan the purpose of which violated the existing laws and served eventually, under the cloak of numerous misrepresentations, and through plots, intrigues, and coercion, as the means of causing payments to the Association of approximately $2,000,000 of public funds in excess of the sum provided by the Congressional Act for the payment of aeroplane patents.

(g) Besides aiming to obtain large sums of public funds not authorized by and in contravention of the Act of Congress referred to, the agents of the Manufacturers Aircraft Association misused the names of government agencies and departments, to which they claimed to be connected, for the purpose of obtaining priority shipments of materials for themselves and delaying shipments of materials to their competitors, and in other ways practicing restraint of trade and violating the anti-trust statutes.

(h) By large expenditures of money in maintaining a lobby in Washington and by circulating misrepresentations and falsehoods the agents of the Manufacturers Aircraft Association always succeeded in hiding from the investigators the evidence of their conspiracy. For instance, none of the investigators knew during their investigations the following facts:

(*Continued on page* 626)

THE NEWS OF THE WEEK

Army Gets JL All-metal Aeroplane

An all-metal monoplane, a sister ship to the JL-6, which recently broke the non-stop record from Omaha, has been delivered to the Army Air Service at Mitchel Field. Bert Acosta, pilot on the Omaha trip, took the machine over from Central Park, L. I., to Mitchel Field.

Aeroplane Service in Finger Lake Region

Auburn.—Aeroplane pleasure trips for vacationists are forming a new attraction in the summer colonies of the Finger Lakes region of Central New York. The service was started on Seneca, Keuka and Cayuga lakes, with similar service to open within a few weeks on Canandaigua, Owasco and Skaneateles lakes.

Aerial League Celebrates

The Aerial League of America celebrated the fourth anniversary of the organization of Aerial Coast Patrol No. 1 yesterday by sending congratulatory telegrams to the persons who organized the patrol at the home of Henry P. Davison, July 4, 1916.

The telegrams were signed by Reed G. Landis, secretary of the league, and were sent to Mr. and Mrs. Henry P. Davison, Lieut. Trubee Davison, John Hays Hammond, Jr., and Henry Woodhouse. Two of the original members of the unit, A. D. Sturtevant and C. S. Reed, were killed overseas in the war. Lieut. Davison was injured in training, but has recovered.

American Aviators Promoted By Poles

Warsaw.—Major Cedric Fauntleroy of Chicago, has been appointed chief of aviation of the Second Army. Captain Merion Cooper of Jacksonville, Fla., will succeed Major Fauntleroy as commander of the Kosciusko Squadron.

Poland expressed gratitude for the aid given the Polish army by the Kosciusko Squadron in a message sent by the Foreign Minister to the Polish Legation at Washington.

Aero Club Announces Entries for Balloon Race

The Aero Club of America announces twelve entries for the National Balloon Race at Indianapolis, Ind., Sept. 11, 1920. This race will be the eliminating race for the International Balloon Race at Indianapolis, Oct. 23, 1920, for which three contestants and three alternates will be chosen representing the United States. For the International Race three have entered from France, three from Italy, one from Great Britain and one from Belgium. With the three from the United States there will be eleven in this contest.

The entries for the National Race are as follows:

Wm. S. Assman, representing the city of Little Rock, St. Louis; J. S. McKibben, St. Louis; A. Leo Stevens, United States Army Balloon School, Ft. Omaha; Lt. Raffe Emerson, U. S. Navy, Washington, D. C.; S. S. Cole, St. Louis; H. E. Honeywell, Clayton, Mo.; R. H. Upson, Indianapolis (Winner last International Race); Roy F. Donaldson, Springfield, Ill.; Arthur C. Hoskins, St. Louis; Capt. J. M. O'Reilley, St. Louis; Warren Rasor, Brookville; Bernard Von Hoffman, St. Louis.

Albert B. Lambert has been appointed Director of Flight and will announce Committees and name the starter. Carl G. Fisher will be Referee and Major Thomas F. Baldwin, Measurer. Acting Chairman Contest Committee will be Charles J. Glidden.

New York Men Commute in Seaplane

Ten bankers and business men tried out a new form of commuting recently when they flew in a big redesigned Navy F5L aerial cruiser from the Columbia Yacht Club, at the foot of West Eighty-sixth street, New York City, to their summer homes at Southampton, L. I., over 100 miles away.

The flight of 105 miles was made in seventy-nine minutes. The fastest time made by the Long Island Railroad over this distance is 2 hours 43 minutes.

According to Charles E. Mitchell, president of the National City Company, who was the host in the aerial party, a bi-weekly service may be organized so the bankers, who are enthusiastic golfers for the most part, may get an occasional game of golf in during the week without the time and trouble of a long trip by train or automobile.

Mr. Mitchell's guests were:

John T. Greer of C. D. Barney & Co., brokers; Charles B. Macdonald of the New York Stock Exchange, President of the National Golf Club; Howard Page, formerly treasurer of the Standard Oil Company; John W. Cross, of Cross & Cross; Stewart Walker, of Walker & Gillette, architects; Newell W. Tilton, broker; Ralph Ranlet, of the New York Stock Exchange; Robert Wrenn, of Wrenn Bros. & Co., brokers, and Inglis M. Uppercu, President of the Detroit Cadillac Company.

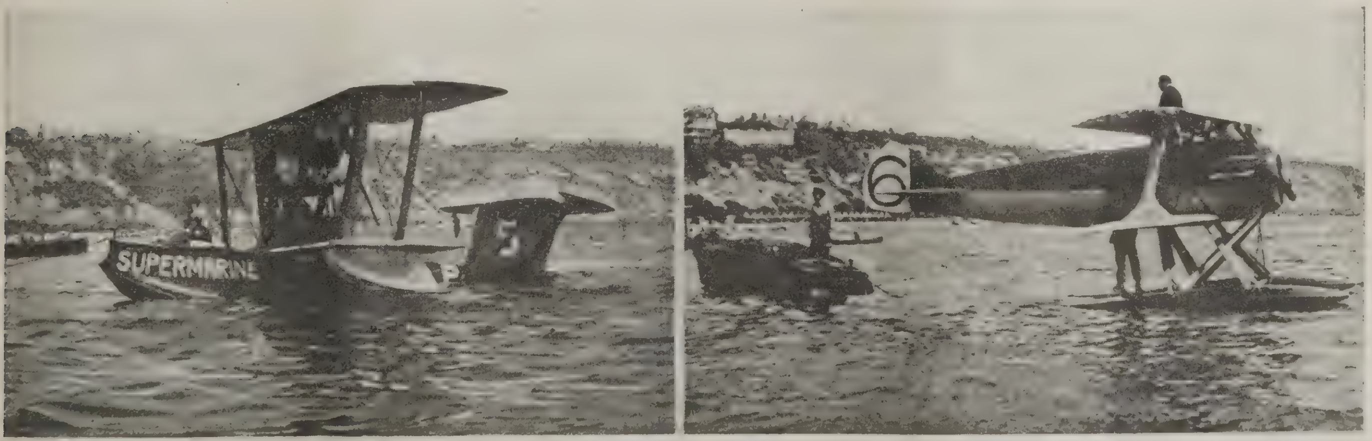
The machine was piloted by W. H. Alexander, formerly a Lieutenant in the United States Navy, and had on board also two mechanics and two photographers.

Society Attends Flying Field Opening

S. C. Ireland, President of the Curtiss-Eastern Airplane Co., distributor of Curtiss aeroplanes and flying boats for Pennsylvania and Maryland, has announced the opening of the 1920 flying season at the Pine Valley Flying Field by sending out engraved cards to prominent Philadelphians. A large attendance resulted and witnessed the aerial races and exhibitions. W. H. McMullen of the Curtiss Aeroplane and Motor Corporation, flew a Curtiss K-6 Oriole from New York to Philadelphia, and captured two firsts,—reaching 9,700 feet in 20 minutes, the altitude contest, and the 15 mile handicap race. Three other types of Curtiss machines competed, the OX-5 Oriole, the JN-4D, and the Standard J-1. McMullen also thrilled the crowd with an exhibition in a Curtiss JN-4D. The other pilots who took part were: Lt. H. B. Wilson, R. A. F.; Lt. J. W. Lyell, R. A. F.; Lt. H. S. Greenawalt, U. S. A. S., and K. J. Dooley, U. S. A. S.

Kearney, Neb., Has Aviation Field

A fine aviation field has been opened at Kearney, Nebraska, and hangars are being erected for the accommodation of local and tourist aeroplanes, as well as arrangements made to keep on hand at all times oils and gasoline. The field is perfectly level, and at present runways are cut for landing. It lies one and a half miles east of the center of the city and directly south of the Kearney Military Academy and on the Lincoln Highway, making it an easily located field. Several aeroplanes are located there now. The field is being promoted by Thor Bronderslev and R. M. Barney, of Kearney. Mr. Bronderslev has his own plane ready at all times for commercial work and is in charge of the field.



Left: Supermarine Racing Flying Boat at Monaco. Right: Spad-Herbemont hydro-aeroplane which made the best speed record at the recent meet at Monaco

Two NC's Awaiting Shipment to San Diego

Having been held up in shipment because of a dire lack of tonnage, the two NC flying boats which were scheduled to arrive at the Naval Air Station, San Diego, Cal., will soon be en route via boat and the Panama Canal.

The NC twins which have been allotted to the aid detachment of the Pacific fleet, are the numbers 5 and 6, and it is understood they will have as mother-ship and tender the U. S. S. destroyer *Mugford*, which is at the present time being altered at Mare Island preparatory to the arrival of the gigantic planes.

It had originally been planned to have the two huge flyers transported across the continent by railroad, but because of their bulkiness and weight, the project had to be abandoned.

The Peerless Flyers Corporation

The Peerless Flyers Corporation, featuring Mr. L. (Fearless) Finney, aerial acrobat, are on an exhibition tour in the northern states, and have been booked almost solid between July 3 and November 10 of this year.

Finney performs various stunts on the planes, including the changing from one aeroplane to another in midair. His feat of dropping from a plane with two parachutes proves to be the thriller for the spectators.

The Peerless Flyers travel in four aeroplanes, and along their routes they carry passengers.

Propose Aerial Mail Service for Seattle, Wash.

Seattle.—Acquisition of a landing field for air craft combining natural advantages sought by aeroplane and water planes by the Kings County commissioner gives Seattle an aviation base of 219 acres, with an option on 40 acres more.

After weeks of study and after surveys had been made by the Postoffice Department, Army and Navy experts and commercial flyers, the commissioners voted to purchase the Sand point base. It was agreed that there was no location in the Pacific Northwest comparable to Sand point in natural advantages. It was pointed out that the peninsula of land is easily visible from the air because of its position on a lake of a magnitude precluding obscurity. It was argued too that seaplanes and aeroplanes would be equally at home; that the topography of the point was admirably adapted to the purpose; that its relation to the city was satisfactory, being neither too distant for convenience nor too close for pilots to be endangered by buildings.

Edward McGrath, superintendent of railway mail service, recently had a conference with Arthur Prager, second assistant postmaster general, when that official visited Seattle to investigate Seattle, Vancouver and Victoria aerial mail service.

The establishment of the air service between Seattle and British Columbia cities will be made within a short time. Arrangements for the trial flight with mail from here to Vancouver and Victoria and return are in the hands of the Canadian postal authorities, and the results will largely influence the final decision of the postoffice department.

Inauguration of aerial mail service which will be made possible by the new landing field will result in the material saving in the exchange seattle banks now pay on money in transit to and from Eastern centers.

Seattle banks being so far distant from eastern finance centers transact urgent business by telegraph, as under present postal conditions it requires nearly two weeks to write to a New York concern and receive an answer.

Radio Warns Mail Plane

Washington.—A practical demonstration of the value of wireless communication with commercial aeroplanes during flights was recently made in the operation of the regular mail plane between Cleveland and Chicago.

This aeroplane, a large Martin twin motor machine, left Cleveland under perfect weather conditions about 3 o'clock in the afternoon with the mail for Chicago. The wireless operator was in touch with various stations within a range of 100 miles. In the course of the flight the Cleveland station picked up the plane by wireless and transmitted a storm warning from the lower lakes for the aerial mail pilot. The radio operator at once got in touch with navy stations for further details as to the velocity and direction of the wind in the approaching storm, with the result that the plane landed at the emergency aerial mail station at Bryan, Ohio, where additional gas and oil were taken on to meet the approaching head winds. The plane, being so re-serviced, proceeded to Chicago and within an hour ran into a thunderstorm.

The radio operator reported that the lightning discharges were so near the plane that the amplifier of the radio set was paralyzed and that he was obliged to remove the radio helmet from his head. The antennae absorbed an electric charge while passing through clouds, shocking the operator. He pulled in the antennae, until the storm had passed.

By this time darkness had set in and the pilot and the plane had an S O S call sent to the stations surrounding Chicago, asking the field manager to set flares and turn on the flood lights to allow a landing in the dark. Seven amateur and regular radio stations responded, with the result that with this assistance the field was lighted.

It is the opinion of the Post Office authorities that this single instance in the use of radio in the mail work saved costly damage to a $40,000 aeroplane and possible injury to men which would have resulted from a crash in the dark.

Book Review

Airplane Photography, By Herbert E. Ives

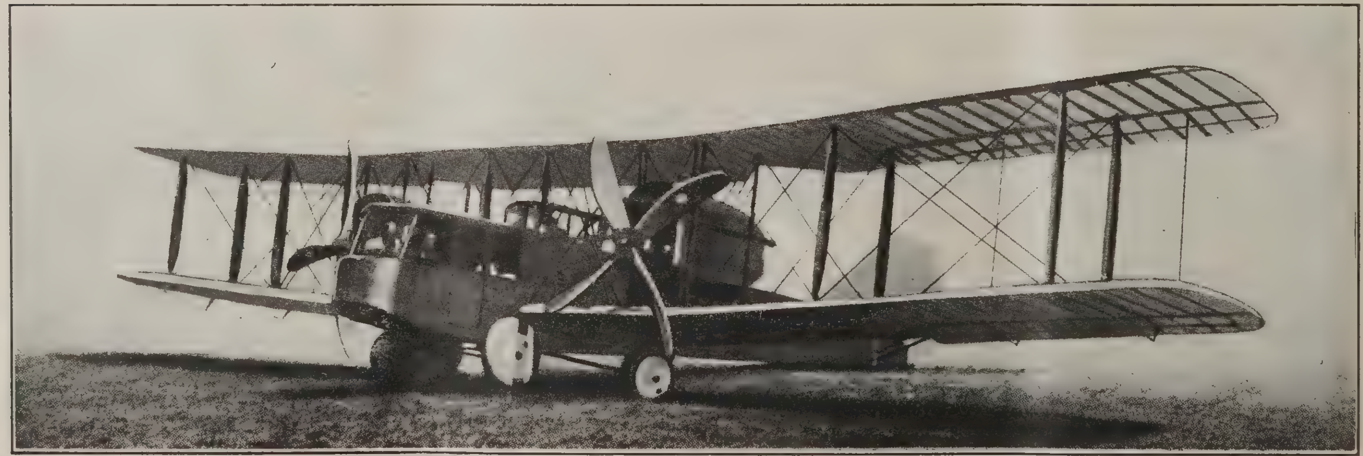
Major in charge of Experimental Department, Photographic Branch, Air Service. 210 Illustrations. Octavo.

Aeroplane photography passed through a period of feverish yet remarkable development in the great war. Its growth in times of peace is sure to be even more wonderful and rapid. There are infinite possibilities and practical uses to which aerial photography may be put. In the preparation of this manual, although it is assumed that the reader is a practicing photographer, yet considerable space has been devoted to the fundamentals of photography and scientific methods of study, tests and specifications. This has been done because aerial photography strains to the utmost the capacity of the photographic process, and it is necessary that the most advanced methods be understood by those who would secure the best results or make the next advance.

The author has had a wide experience and in this work covers the subject very thoroughly and emphasizes those general scientific principles which apply, no matter what may be the purpose, to making photographs from the air. To this end the author has kept constantly in mind the peaceful application of photography, although his knowledge has been drawn from experience covering military assignments.

The book is divided under seven general heads: Introductory; the Airplane Camera; the suspension and installation of Airplane Cameras; Sensitized Materials and Chemicals; Methods of Developing Plates, Films and Papers; Practical Problems and Data; the Future of Aerial Photography.

The book is obtainable through the Aeronautic Library, Inc., 299 Madison Avenue, New York City. Price $4.00.



Three-quarter front view of the Grahame-White five passenger Aero Limousine, equipped with two 320 H. P. Rolls-Royce Eagle V engines

The AIRCRAFT TRADE REVIEW

Lighter-Than-Air Craft Station Opened at Akron

The Wingfoot Lake Air Station at Akron, Ohio, recently was opened for public flights in pony blimps, spherical and kite balloons. The station which is being operated by the Goodyear Company has attracted much interest and many flights have been made.

The field has been equipped with one of the latest type "pony blimps," three spherical balloons and a kite or captive balloon such as is used in the U. S. Army for observation purposes. These are in charge of veteran pilots, most of whom trained thousands of U. S. Navy student fliers during the war.

The purpose of Goodyear in throwing open the field on Saturdays, Sundays and holidays during the year is to give the public an opportunity at nominal cost to learn the delights and safety of aerial travel in lighter-than-air craft.

The three passenger pony blimp proved to be popular as it has a speed of about 40 miles an hour.

Spherical balloons, without motive power, carry passengers on cross country flights. Motor cars follow the balloons so that the passengers may return to the starting point at the expiration of the time for which they have paid to fly.

Other people who prefer to "keep one foot on the ground," can go up in kite balloons, firmly moored to the ground by a wire cable. From a height of 1000 feet, a wonderful view of Akron and nearby cities can be obtained with absolute safety.

Symons-Russell Aviation Company Changes Personnel

Spokane, Wash.—The Symons-Russell Aviation Company of Spokane has been dissolved. Foster Russell will take the assets of the company and its field at Hardesty Road and Sprague Avenue and will operate under his own name. Mr. Symons will retain a Standard machine for his own use and it is understood he expects to engage in exhibition and passenger flights in the country this summer and to give instruction this fall.

Mark Landing Field at Springfield, Mo.

Steps have been taken by the Chamber of Commerce of Springfield, Mo., to provide an aviation field for Springfield. The work of marking the landing field adjoining Phelps Grove Park on the south has begun so that all aviators crossing the city will see the familiar insignia of a landing field and will know that proper facilities are there to take care of them.

The decision of the Chamber of Commerce to take this step results from many letters received lately from the United States Government, from aero navigation companies, and from individual owners of aeroplanes throughout the country.

A circle large enough to be visible from a great height will be drawn around the field and will be filled in with white chalk so that the marking will be permanent. In addition to this a high pole will be set up on the field and to it will be attached a long white streamer so that pilots may know the direction of the wind and make safe landings.

Ralph Snavely, Springfield aviator, and Ernest A. Stehlik, his mechanician and also a pilot, will assist the Chamber of Commerce in the work. The field belongs to the Snavely Aerial Corporation.

Lester Cox and John Garrett have been appointed as an aviation committee to supervise the preparing of the landing field there. When the field is finished it will be recorded by AERIAL AGE.

Manhattan, Montana, Boosts Aviation

A very interesting aviation meeting was held recently in Manhattan, Mont., under the auspices of the Manhattan Commercial Club. It was called a "Boosters" Meeting and much was accomplished for the benefit of aviation.

A Curtiss JN4D owned and operated by the Inland Empire Aerial Training Corporation, flew from Butte, Montana, to help make the meeting a success. The pilot was L. G. Rees, and the passenger, E. K. Parker, dropped hand-bills from the machine as they passed over the towns en route to Manhattan, inviting the people to attend the aviation meeting.

During the day the aeroplane was kept constantly in the air carrying passengers. In the evening a banquet was held and over 300 persons were present. Aviation was the chief topic and William Iverson, Secretary and Treas. of the Inland Empire Aerial Training Corp. delivered the main address on aviation. He outlined plans for a state-wide aerial service.

The Manhattan Commercial Club is keenly interested in the progress of Commercial Aviation. Through the efforts of its president, Mr. E. M. Wright, and Secretary Mr. Pay, it has secured a lease on 160 acres of land to be used as a Municipal Landing field. This field will be put in first class shape so that any ship, regardless of size, can land there and receive fuel or supplies. This is all done by the citizens of Manhattan through the efforts of its Commercial Club, and they are hoping that all flyers who pass through Montana will avail themselves of the facilities provided.

The other cities in the Gallatin valley are starting to prepare landing fields, and before long the valley will be dotted with good landing fields.

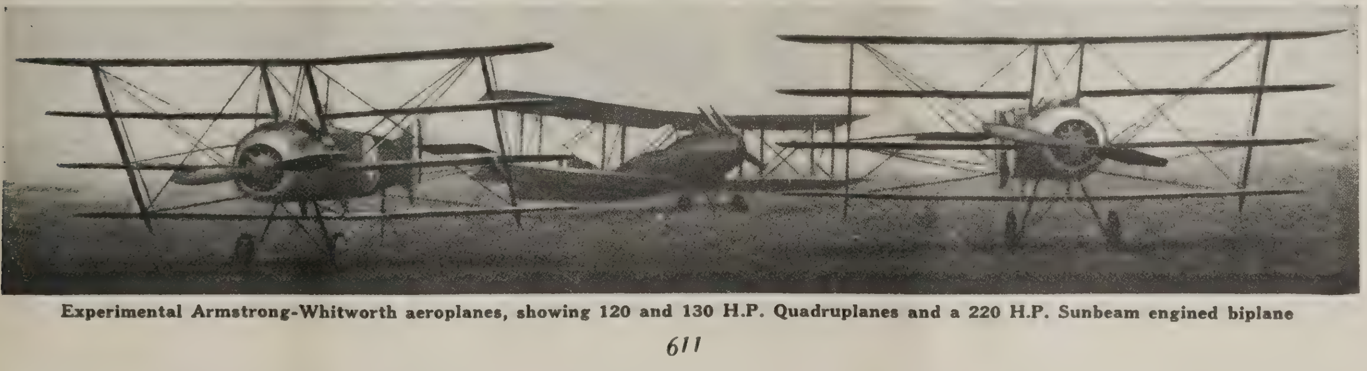
Eventful Flight from Greenville, Miss., to Cincinnati, O.

One of the most unique experiences that has yet been encountered by an aviator, overtook Pilot K. L. Leonard of the Cincinnati Aircraft Company in a recent flight from Greenville, Miss., to Cincinnati.

Leonard was ordered from New Orleans where he was giving exhibition flights to bring his plane to Cincinnati where it was to be put in passenger service. Leaving New Orleans he proceeded to Greenville, Miss., for repairs and further instructions. He reached Memphis on schedule, tanked up and continued the trip. Fully a half mile from his take off was one lone tree and Leonard took the top off it and landed in a cornfield. Accompanied by Mechanic Smith, he repaired his machine and proceeded to Cairo, Ill., where he was promptly arrested for stealing the plane. Extracting himself from this difficulty he took the air and it began to rain torrents compelling him to settle in a field near Evansville.

In the meantime Charles E. Lay, President of the Cincinnati Aircraft Company, had heard nothing from Leonard since leaving Memphis, and he was then 48 hours overdue in Cincinnati. Lay burned up the wires and newspapers all over that section began to hunt Leonard who it seemed had fallen in some isolated spot. Sunday and Monday passed without a word and Monday, Lay ordered two aeroplanes out in search of the missing pilot. These both reported "Nothing seen or heard." Wednesday evening just as they were leaving for Memphis, Mr. Lay received the following telegram from Leonard dated Corydon Junction, Ind., "A cow drank our gas and died. Farmer holding us for $80. Wire funds."

Funds were promptly wired, and Leonard proceeded to New Albany, Ind., and after a few minor repairs reached Cincinnati.



Experimental Armstrong-Whitworth aeroplanes, showing 120 and 130 H.P. Quadruplanes and a 220 H.P. Sunbeam engined biplane

PACKARD AERO ENGINE TYPE 2025

A NEW American aero engine that is expected to develop speed far greater than anything yet achieved, that can produce 500 to 600 horsepower and that is absolutely fireproof, has been completed and put through highly satisfactory preliminary tests. The engine is designed by Col. Jesse G. Vincent, co-designer of the Liberty motor, and now vice-president of engineering of the Packard Motor Car Company, at whose plant in Detroit the engine was built.

The power, reliability and lightness of this motor, as shown in the preliminary tests, have raised the highest hopes in the men who are handling it. It is believed that a sustained speed of around 200 miles an hour can be achieved, and that this is more than likely to be considerably exceeded. This would be equivalent to 320 kilometers.

The engine is a particularly interesting one in that it is not a racing freak nor a "special," but is a development along recognized lines, intended for quantity production and with a flexibility, economy, stability and reserve power that fit it for wide use along either commercial or military lines. In fact, Packard is already at work on a group of these motors for the U. S. Navy.

Col. Vincent's best ideas as developed by his experience in the war are embodied in this engine, and it is the result of his study of the service performances, not only of the Liberty motor but of all the best English, French, Italian and German engines which were at the disposal of the American army engineers. The design was made by the Colonel with the Army and Navy experience and lessons fresh in his mind and includes all the improvements which they indicated.

In spite of the high speed expected and the obvious war value of the engine, Col. Vincent believes that its greatest usefulness to America will be in commercial employment.

"America is not a military nation and never will be," he says, "and aeronautics cannot look to government military and naval appropriations for the financial support necessary to its proper development. On the other hand, it is clear that we will never be safe in a military sense until we are prepared to dominate the air above the country in case of emergency.

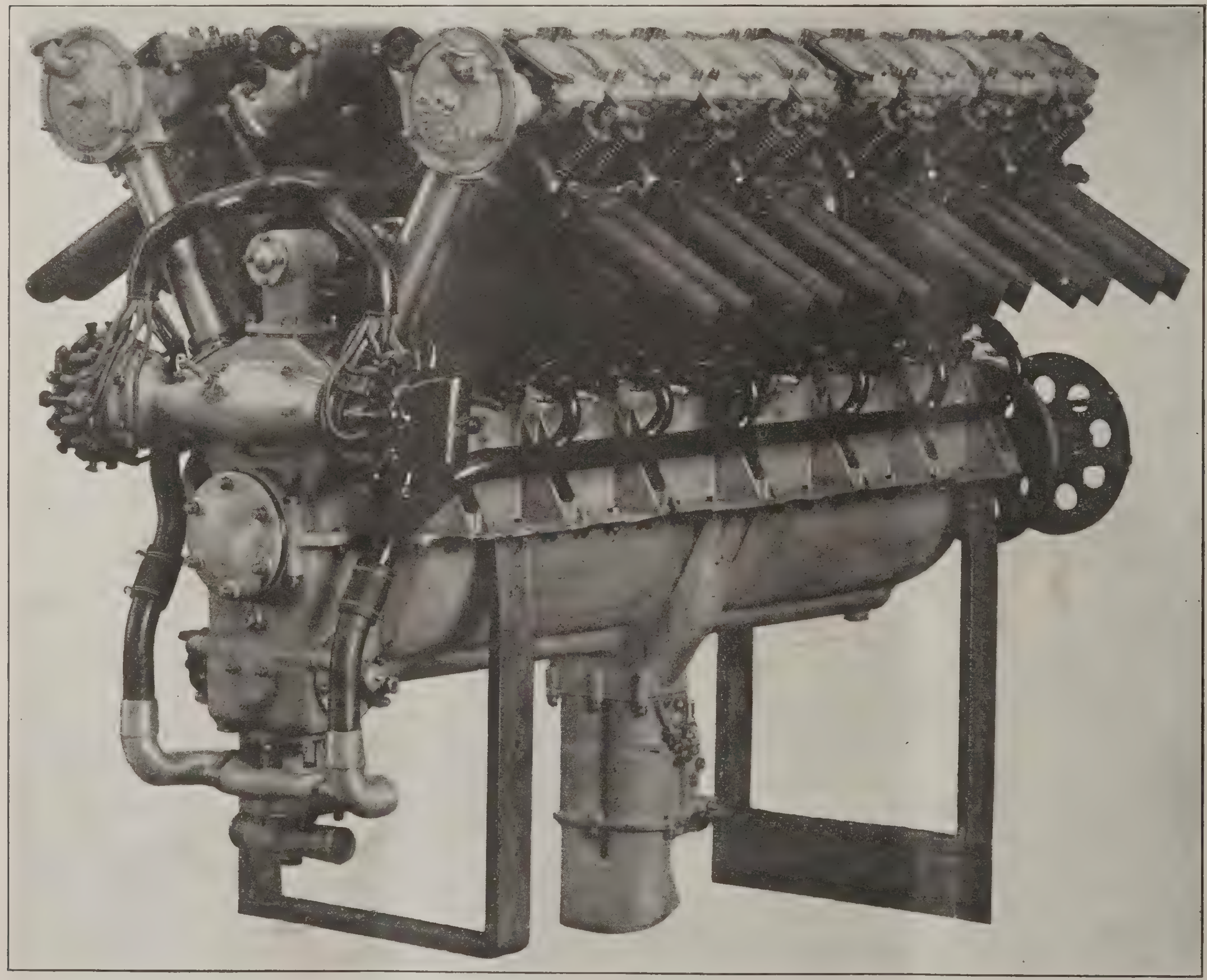
"The commercial development of the aéroplane is the only possible answer to this problem, and it must be a development which will establish aeronautics on a firm financial foundation as a going business. At present America, thanks to the war experiences, is second to no nation in the building of aeroplane engines with the possible exception of fixed air-cooled radials. Although we are behind in the development of planes, we can claim the invention of almost all the devices that are now used in aeroplane building all over the world. I am convinced that with a sound financial basis we have the talent and the equipment to permit us to lead the world.

"It is for these reasons that I expect the greatest value from the present engine to come in commercial uses."

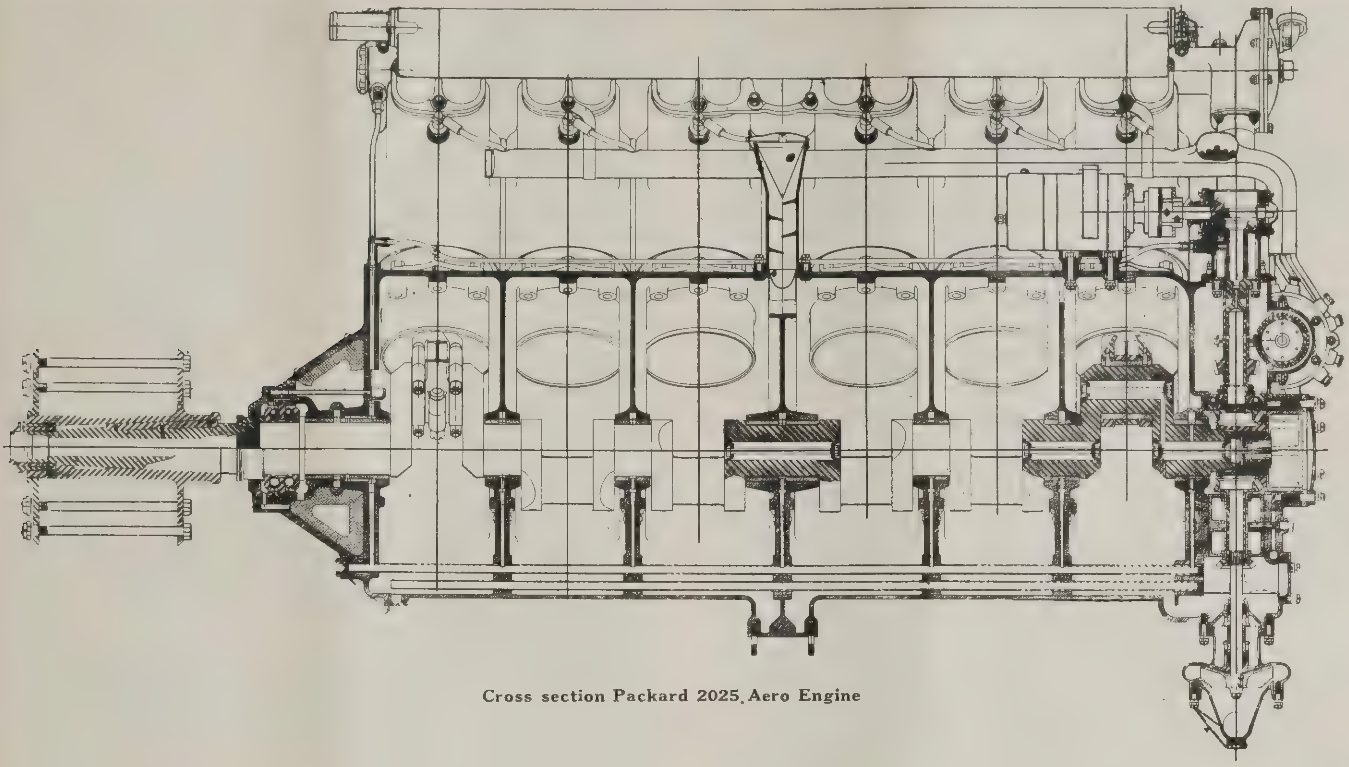
This particular engine is the largest which Col. Vincent considers practicable for general purposes and completes a series of three which he has made since the war, designed to meet among them practically all standard demands for aeroplane engines.

The Colonel, whose experience enables him to speak with authority even concerning an engine of his own design, is greatly pleased with the results so far shown by his motor.

"A survey of the power curve indicates that this engine



The Packard Aero Engine Type 2025. The illustration shows the outstanding features of the design: Double ignition, accessibility of the water pump, and of the carburetor below the crankcase, and the double valving



Cross section Packard 2025 Aero Engine

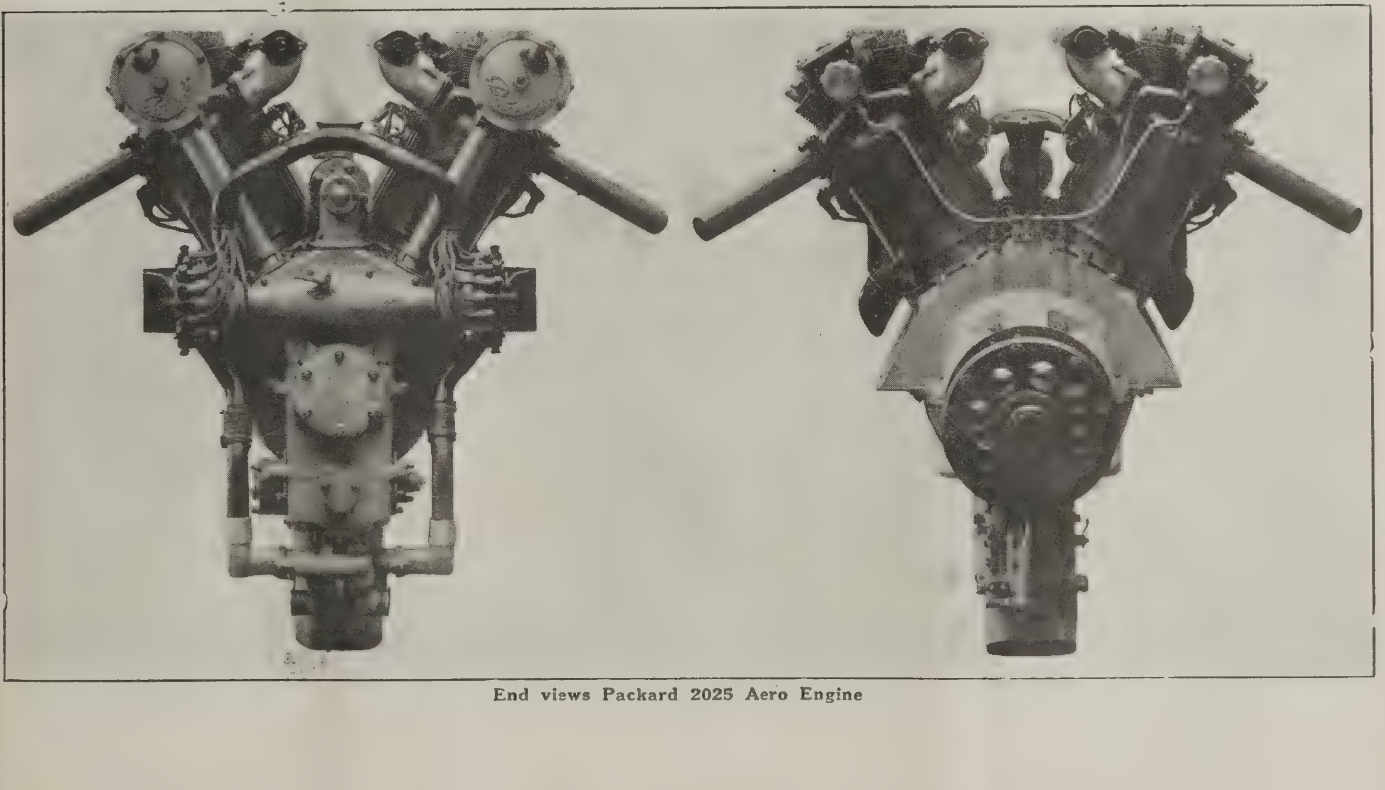
could be utilized in many different types of planes, due to its comparatively light weight and its smoothness at high speeds," he says. "It has many advantages over any other type of engine known for almost all duties which require either great power or a considerable reserve of power. Its flexibility makes it available for either speed or heavy loading.

"If, for instance, with a slow-moving, heavily loaded plane a horsepower of from 400 to 420 is desired, this engine is eminently suitable. It will develop this power at speeds of from 1,275 to 1,350 revolutions per minute, and at this speed a high propeller efficiency can be secured, and the life of the engine will be greatly prolonged. Under cruising conditions I believe that this engine will have an extremely long life, and at the service outlined it should give in the neighborhood of 250 flying hours without overhauling of any kind. This is the kind of plane that in war would be most useful as a night bomber or for similar heavy duty, and in commercial use for multi-passenger freight or other weight-carrying duty.

"At a slightly greater speed, about 1,500 r.p.m., the motor develops about 475 horsepower. This would represent a good combination for long distance flight at around 120 miles an hour as for a day bomber, giving considerable normal speed and with a reserve power of something like 125 horsepower for use in case of emergencies. This is enough to insure excellent performance.

"For racing, of course, speed is the main consideration, and for this purpose the engine is capable of furnishing 600 horsepower at 2,000 r.p.m. The comparatively small weight of the engine makes it possible to use a light, low-resistance plane, and it is more than safe to assume that some startling results in the way of high speed can be obtained. The performance of the engine under test shows that it is extremely reliable, and that danger of trouble from failure of performance is almost nil."

The most radical innovations in the new engine, which takes the name "2025" from the number of cubic inches in its piston displacement, are in the valves and carbureter arrange-



End views Packard 2025 Aero Engine

ment. Four valves are used in each cylinder and this generous valving has resulted in a very high mean effective pressure even at great speed.

The carbureter is located below and outside of the crankcase, thus making the engine fireproof, giving a gravity feed, saving weight and providing extreme accessibility. It is of the double venturi type, with an improved altitude control, and equipped with the Packard fuelizer, which insures perfect combustion even with inferior fuels and permits prompt acceleration even when the engine has been cooled by a long glide, thus removing one of the aviator's most serious troubles.

"The use of this single duplex carbureter was considered more or less of an experiment," Colonel Vincent says of this arrangement, "since there was no precedent to serve as a guide as to whether good distribution and maximum power could be obtained with such a layout. However, in view of the overwhelming arguments in favor of a single carbureter, it is very gratifying to note that the results certainly justify the correctness of the design.

"This location of the carbureter, which permits of gravity feed with the minimum amount of piping, certainly should commend itself to the aeroplane designer. The fire risk, in so far as the carbureter is concerned, is entirely eliminated, since all vents are outside the cowling. The data obtained in regard to power output, gasoline consumption and inlet manifold depression indicate a very satisfactory result, and it is doubtful whether two carbureters would do better.

"The problem of synchronizing the throttle control of two separate carbureters as well as the altitude control has always been a source of much trouble, so that this use of a single duplex carbureter for a large engine can be considered to represent a distinct advance from a standpoint not only of design but of installation and maintenance."

The engine is of the 12-cylinder type, the cylinder blocks of six being set at an included angle of 60 degrees. The cylinders are of 5¾ inches bore and 6½ inches stroke, as large as it was considered practical to make them, and they give a total piston displacement of 2025 cubic inches. The engine complete weighs 1118 pounds, and on the first test gave 578 horsepower, or 1.94 pounds per horsepower, which is very satisfactory when compared to the 2 or 2½ pounds per horsepower developed by the best of the engine used in the war. A properly designed nose radiator weighs approximately 130 pounds, the water in the cylinder jackets, circulating pumps and pipes weighs 58 pounds, and the water in the radiator about 52 pounds, making the weight for the entire plant 1356 pounds, or 2.275 pounds per horsepower on its indicated production of 600 horsepower, which is the lowest for any standard make of engine.

Other details are as follows:

The longitudinal center of gravity is ⅝ inches to the rear of the center line of the engine.

The piston clearance is 0.020 inches; there are three rings above the piston pin and one below it.

There are two inlet and two exhaust valves per cylinder, all of two inches diameter. The exhaust valves lift ⅜ and the inlet valves 7/16 inches and the compression ratio is 20%.

The inlet opens 10 degrees after the top center and closes 45 degrees after the bottom center; the exhaust opens 48 degrees after the bottom center and closes 8 degrees after the top center.

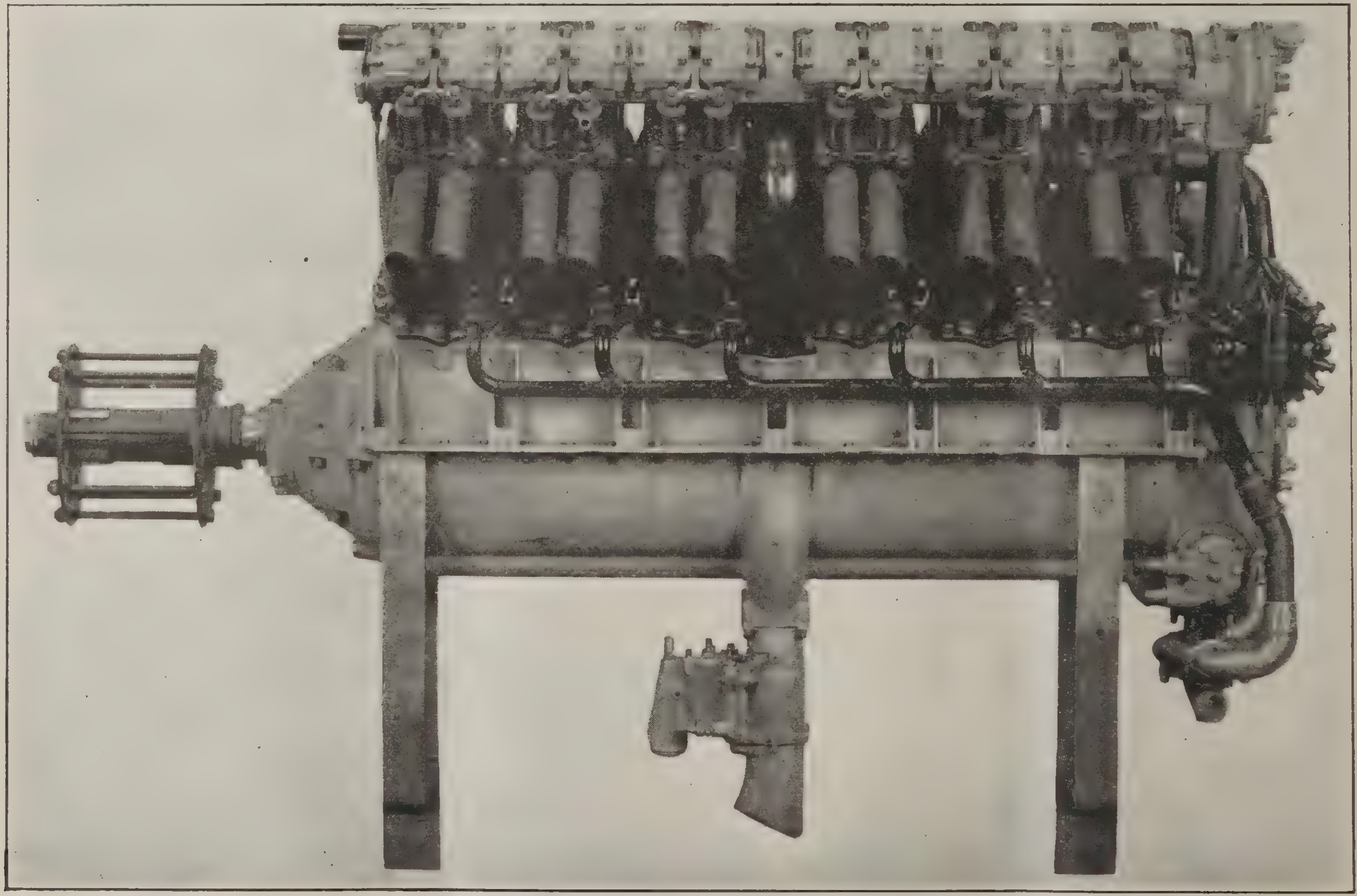
On the ignition the full advance is 45 degrees early and the full retard is 9 degrees late.

In mechanical details, except those already mentioned, the motor shows few important changes from established practice. The crankshaft is of the seven bearing type with the bearings carefully proportioned in size to insure uniform life. The connecting rods are of the straddle type, carefully proportioned as to weight and bearings. The pistons are aluminum, die-cast, with floating piston pins and the improved arrangement of the rings already referred to which increases the oil economy and prevents fouling of the spark plugs. The center of the piston head is supported and cooled by a pedestal resting on the piston ring.

The propeller hub is of the quick-detachable type, designed especially to prevent freezing on the shaft or working loose.

The crankcase is of the box-section type, split on the center line of the crankshaft, and with the main bearings carried between. Great rigidity is obtained by means of long through-bolts, which serve the purpose of uniting the two halves into a single rigid unit.

The cylinders are of the individual steel type, now generally recognized as being the lightest and most reliable design developed to date. This type of cylinder was developed by Packard engineers, working under Colonel Vincent before the war, and was contributed by Packard to the Liberty aeroplane motor. It gives the best possible water circulation and therefore the best valve cooling, with the result that valve trouble is practically eliminated. A new rocker-arm mechanism handles both valves simultaneously, thus avoiding uneven



Left side Packard 2025 Aero Engine

weight on the rocker-arms, and the result shows in the excellent condition of the rocker-arm bearings after test.

The camshaft and rocker-arm assembly is enclosed, a type developed by Packard and used on the Liberty motors, except that it is improved and modified to insure better lubrication and greater tightness. In the matter of leakage from the camshaft housing, as a result of the improvements, this engine was found to be superior to all its predecessors. This was due to the design which provides a bearing on either side of the rocker-arm to the device which seals the opening at the outer end of the rocker-arm journals and to the small clearance which is possible at these points.

The lubrication is of the full pressure feed type, operating with a dry sump. The engine is designed for the use of a nose radiator, but is equally adaptable to any other type of radiator arrangement.

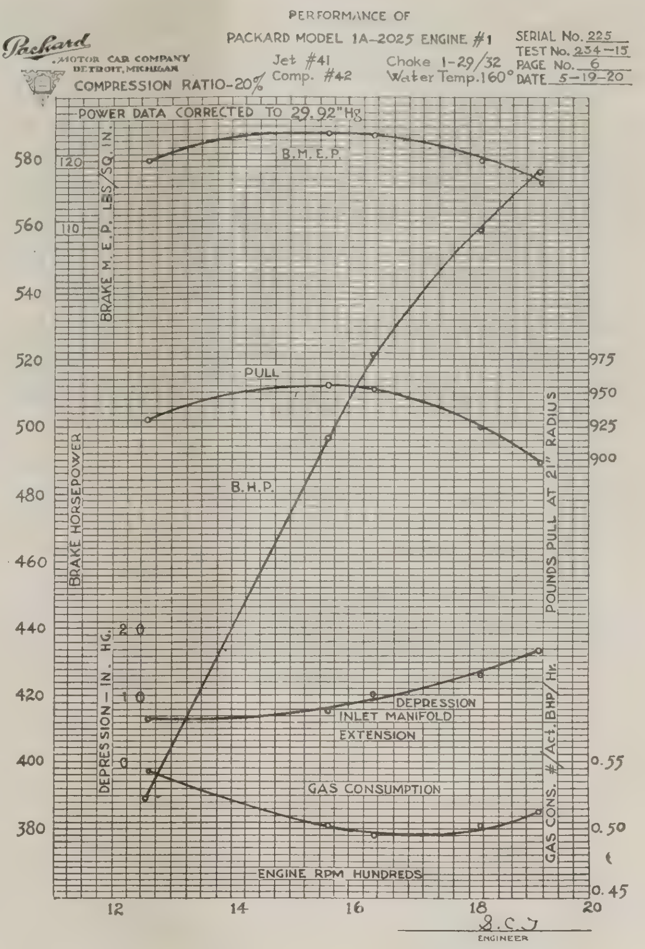
Ignition is of the improved Delco Type, in which the distributor heads remain stationary and the spark advance is obtained by advancing the drive-shaft. Complete double ignition to two sets of spark plugs is provided, and the engine will function properly on either set. The heads are easily accessible from either side of the fuselage.

Throughout the design of the engine accessibility of parts and ease of installation was most carefully considered, and as a result it is believed that the engine is the most accessible of its type that has been produced. The spark plugs are notably accessible, thanks to the clean "alley" between the cylinders, which makes it possible to handle them with an ordinary wrench. The water pump is located vertically at the rear end of the crankcase; the oil pump, oil relief valve and oil strainer are all in easy reach on the lower half of the crankcase, and can be dismounted individually without disturbing any other parts of the engine.

It is probable that no other engine has been designed that so perfectly measured up to expectations on its first performance. Except for adjustments of the carbureter, no changes or adjustments of any kind were necessary on the first engine assembled, so accurate had been the design and so perfect the balancing. The results shown in the power curve-sheet were produced by this engine in exactly the condition in which it was received from the assembly department.

The tests were made on a 400 horsepower Sprague dynamometer after the engine had been driven for 15 hours by electric motor on a lapping-in jack, and had been run for 20 hours at about 500 r.p.m. under its own power. Throughout the test no spark trouble of any kind was experienced. The engine ran with exceptional smoothness, which was particularly noticeable at the higher speeds. The acceleration appeared to be excellent, so far as could be judged on the dynamometer and the engine idled very nicely at 250 r.p.m.

In these tests the engine developed 400 horsepower at 1265 r.p.m., 500 hp. at 1570 r.p.m. and 78 hp. at 1920 r.p.m. The limitations of the testing apparatus made it inadvisable to push the engine beyond this speed, but the power curve shows that a development of 600 hp. at 2000 r.p.m. is assured. With a carbureter setting for maximum power the engine gives a gasolene economy of .5 to .52 pounds per horsepower hour, but with a setting to give a maximum economy it was found possible to obtain economies as low as .45 without any detriment to the engine. The rate of oil consumption is .025 pounds per horsepower hour.



After the tests had been concluded the engine was completely disassembled and a very careful examination was made of all the working parts. These were found to be in first-class condition throughout. It was especially noted that the piston clearances had been ample, since the surfaces showed evidence of perfect lubrication. The rocker-arm journals were in excellent condition and the camshaft housing showed no evidence of galling at these points, indicating a satisfactory unit bearing pressure. The use of the bearing on either side of the rocker-arm undoubtedly contributed to this result.

The results of the preliminary test were so satisfactory throughout that when the engine was delivered at the flying field, with the expectation that further ground tests would be made, the engineers there decided these were unnecessary, and proceeded to install the engine at once in a plane.

New Medical Tests for Flyers

Based on the experience gained in the World War, the procedure for physical examination of aviators for the United States Army has recently been revised in many details, the principal changes having been made in the eye and neuro-psychiatric examinations. In the eye examination a depth perception test at twenty feet has been substituted for the old test for stereoscopic vision with the hand stereoscope, a satisfactory apparatus for performing this test having been developed at the Medical Research Laboratory, Mitchel Field. A complete refraction of the eyes in each case has also been included and several additional tests for muscle balance which will make the test much more fair to the aviator. Under the examination of the nervous system provision has been made for the performance of definite tests and a brief personality study has also been included.

The revision was made by the War Department on the recommendation of the Chief Surgeon, Air Service, after consultation with the Medical Research Board at Mitchel Field.

Under the provisions of orders recently issued by the Director of Air Service, every flier will be required to take this examination, with a few modifications, semi-annually. It is also provided that only medical officers specially designated by the Surgeon General shall make these examinations. These officers have all had a special course of instruction in the technique of the examination at the Medical Research Laboratory.

Pilots Check In By Radio Every Five Minutes

The 91st Aero Squadron, now on temporary duty at Ream Field, Imperial Beach, California, is doing daily patrol of the border from Ream Field east to Calexico. To reduce to a minimum the possibility of aeroplanes being lost without immediate knowledge of that fact by the home station, all planes have been equipped with S. C. R. No. 73 sets operating on 377 meters. Pilots are required to check in their position to the home station every five minutes. In order to further prevent possibility of planes becoming lost, the radio officer of the squadron has erected at Ream Field a radio compass station, by which goniometric readings are also taken while the planes are sending position reports. As the course is almost straight east from the home station, the radio officer can tell immediately from the goniometric readings whether or not the ship is keeping on its proper course. If the pilot should lose or mistake his position and turn south, the radio compass would immediately show that the plane was over Mexican territory. It is planned at a later date to establish two goniometric stations with a base line of several miles in order to be able to pinpoint the plane exactly.

WAVE SOARING

By W. T. THOMAS

MANY theories on soaring flight have been advanced during the past century, but comparatively few have been supplemented by weather or "air" conditions observed simultaneously, and it is in the hope that a little additional light may be thrown on this interesting problem that I offer the following remarks, based on first hand observation of a form of soaring flight generally known as "wave soaring" which was observed by the writer from an exceptional point of vantage.

The particular examples of wave soaring to which I refer were furnished by a colony of brown pelicans on the East Coast of Florida. These birds, which have a wing span of from five to seven feet and a wing loading of 1.2 to 1.4 lbs. per sq. ft., may be seen soaring for miles at a time, perfectly steadily, just over the windward side of a wave crest as it rolls in on the gradually sloping beach. As soon as the wave shows any sign of breaking, the pelicans (sometimes three or four in tandem) will "zoom" up twenty or thirty feet in the air and from that height glide seaward over two or three waves and select another "carrier" over which they glide in the same manner until it shows signs of breaking, when the process is repeated indefinitely. See Fig. 1.

The explanation is very obvious to anyone witnessing the exhibition and lies solely in the fact that a very strong upward current is produced by the wind blowing over the sloping face of the wave (which gradually changes from a convex curvature to a concave a few seconds before the wave breaks) and the bird merely glides downward through the upwardly sloping current so produced.

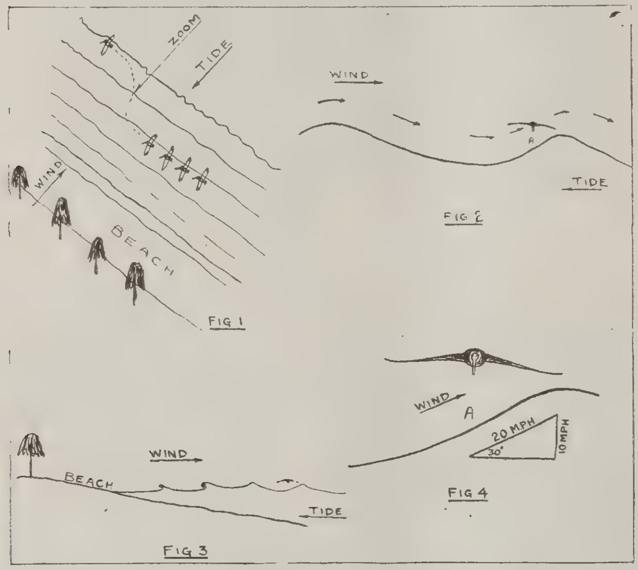


FIG 1

FIG 2

FIG 3

FIG 4

It was noted that this form of gliding could only be participated in when the wind blew from offshore and encountered the wave crests just prior to breaking, and preferably with the tide coming in and apparently was only indulged in for sport or exercise, as no evidence of food hunting or the like was apparent.

As further evidence of the presence of a strong upward current on the windward side of the oncoming waves, the deflection of spray several feet into the air just as the wave commenced to break may be noted.

By means of an automobile it was ascertained that speeds along the beach of thirty miles per hour and upward were maintained quite easily in this form of gliding flight.

An analysis of the conditions existing from an engineering point of view indicates that there is no reason to doubt the fact that a well built aeroplane could exactly reproduce this form of flight, provided of course that waves of proportionate size existed (a condition which would hardly be ideal from the aviator's standpoint).

Assuming an average offshore breeze of twenty miles per hour and waves two to three feet from trough to crest and crests thirty feet apart, as shown in Fig. 2, a condition which existed when the observations were made as nearly as could be judged, and laying these proportions out to scale, Fig. 4, it is seen that the air in passing over the face of the oncoming wave at A has an upward slope of approximately 30 degrees from which it is apparent that the air at A has a vertical component of 20 Sin 30 degrees or 10 miles per hour and the bird could therefore be gliding downward through this current at a speed corresponding to a loss of height of 10 miles per hour and yet maintain horizontal flight without exerting any energy or work.

Considering the pelican now from an aerodynamical standpoint, an average specimen has a wing span of 6 feet and weighs 10½ lbs. His wing area is approximately 8 sq. ft., giving a wing loading of 1.3 lbs. per square foot or roughly one-quarter that of an average aeroplane.

His speed of flight in gliding may be taken at 25 miles per hour in still air. (The examples to which I referred earlier as traveling at 30 miles per hour were flying considerably faster than their normal gliding speed as will be shown later.)

Now fortunately we have an enormous amount of wind tunnel data on model wings which have been tested at speeds corresponding very closely to this speed, and although these do not include a wing section exactly similar to the average section of a pelican's wing, which would be very very difficult to reproduce with exactness, the U. S. A. No. 4 section has been selected as one suitable for comparison.

Fig. 5 shows the maximum safe lifting capacity of this wing at different speeds.

From this curve it is seen that a wing loading of 1.3 lbs. per sq. ft. may be supported at a minimum speed of approximately 20 miles per hour, this being at its angle of maximum safe lift, taken as 12 degrees to the line of flight.

Next let us consider the most probable angle of incidence which would be used in normal gliding flight. Fig. 6 shows the lift and wing efficiency or lift to drift curves for the U. S. A. 4 model wing at different angles of incidence.

Let us see what happens at an angle of incidence of say 5 degrees. From the curves it is seen that the wing efficiency or L/D at this point is approximately 14.8 and the lift coefficient is approximately .00198 which means that in order to sustain 1.3 lbs. per sq. ft. at 5 degrees this wing must travel at a speed V which equals $\sqrt{\frac{1.3}{.00198}}$ or 25.6 miles per hour.

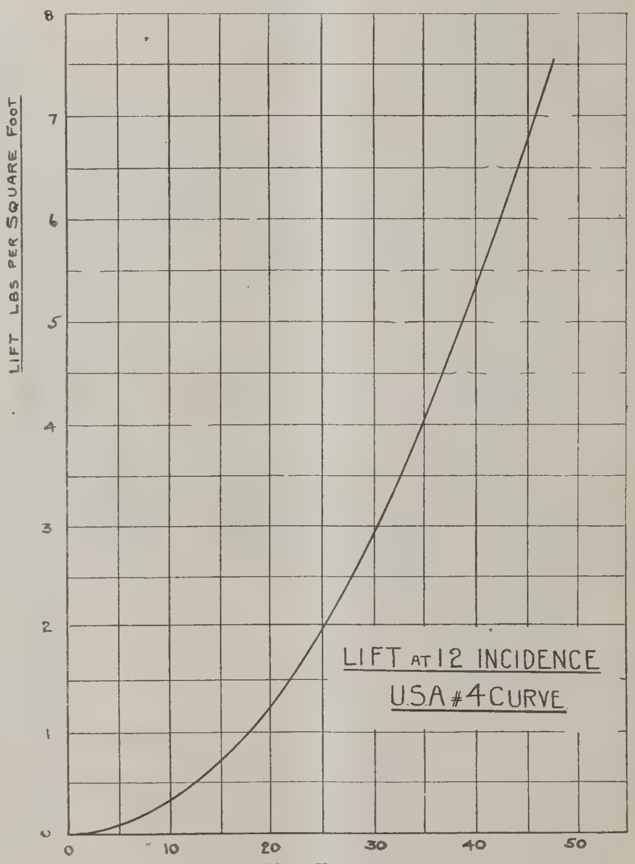


FIG. 5. SPEED MILES PER HOUR

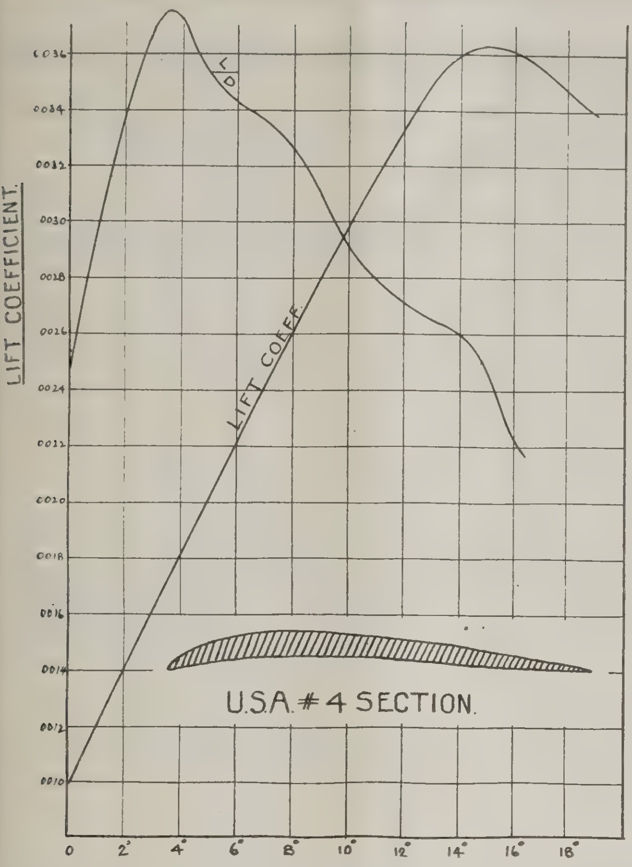


FIG. 6. ANGLE OF INCIDENCE

A wing efficiency or L/D of 14.8 indicates that the wing can lift almost fifteen times as much as it takes to push it through the air. In considering the bird as a whole, however, his body resistance must be taken into account and a fair figure for his overall efficiency might be conservatively fixed at 1 to 10. In other words, if a pelican were pushed through the air at an angle of incidence of 5 degrees, it would exert a lift ten times as great as the effort required to push it.

It is quite probable that this figure is low, as no account has been taken of the "washout" in incidence which undoubtedly occurs, and also the fact that the plan form of the bird's wings is more efficient than that of the rectangular model which was tested.

Incidentally the overall efficiency of a first class aeroplane in gliding flight with propeller free is in the neighborhood of 8 to 11.

With a lift/drift ratio of 1 in 10 it follows that a bird can glide in still air at an angle of descent of 1 in 10, and if our pelican glides at 25 miles per hour at an angle of flight (not incidence) of 1 in 10, he will be descending with a vertical speed of 25 x $^1/_{10}$ = 2.5 miles per hour from which it is seen that if an air current having a vertical component of 2.5 miles per hour is available, a pelican can just soar in it without losing height.

If the current has a greater vertical component than 2.5 miles per hour, he can either rise or (as he usually does) tilt his wings to a smaller angle of incidence or draw them in slightly and go faster, maintaining the same height.

Going back now to our air conditions we had a vertical component of 10 miles per hour, which is four times that which we found to be necessary for horizontal gliding flight, and therefore is sufficient to permit soaring with ease.

As previously pointed out, when an upward current as great as 10 miles per hour is available, the pelican either reduces his effective wing area or decreases his angle of incidence and puts on speed which comes in very useful for "zooming" over to the second or third following wave.

In the case which I have taken, a relative speed through the air of 36 miles per hour is necessary to produce a 30-mile per hour speed parallel to beach. This is clearly shown in Fig. 7.

It is to be noted that the pelican is actually aimed parallel to the line AB, but is traveling slightly crabwise and in the direction AC.

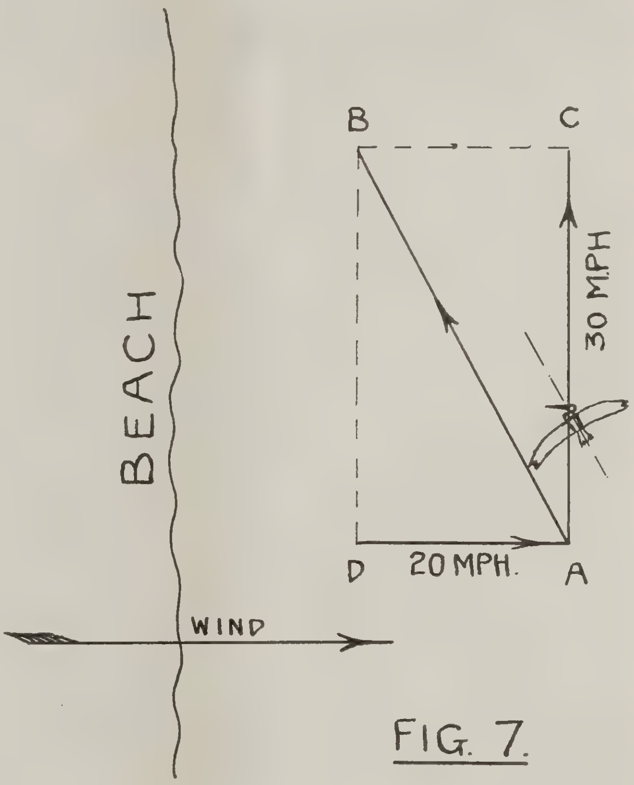


FIG. 7.

BOOK REVIEWS

ELECTRO-DEPOSITION OF METALS, By Dr. *George Langbein and William T. Brannt.*

This new eighth revised and enlarged edition of 875 pages and 185 illustrations contains everything any one wants to know about the plating and finishing of metals, and is practically an encyclopedia of the industry. It gives hundreds of tested formulas for solutions, many of which have heretofore been considered trade secrets.

It is the master treatise on electro-plating, galvanizing, metal coloring, lacquering and electrotyping and covers the history and theory of the electro-metallurgy as well as faithfully reflecting the present advanced state of the art in its every-day applications. While it is in the main a translation of Dr. Langbein's monumental work, it gains immensely by the additions of both the translator and revisor; among these may be mentioned the chapter on "Apparatus and Instruments" and the section of "Useful Tables." This new edition pays particular attention to the practical innovations adopted since the publication of the previous edition, and presents the most recent machinery and apparatus, such as the latest types of plating machines, ball bearing, grinding and polishing lathes, sand blast apparatus for cleaning and lacquer spraying by compressed air.

The sections on the nomenclature of chemicals used in electro-plating have been enlarged and not only are the properties and methods of identifying the various chemicals given in detail, but every known name for the various substances is given. The exhaustive experiments and experience of a master scientist and practical plater are briefed and digested for the benefit of the busy man.

The theoretical section leads up to a masterly discussion of the fundamental principles of electro-chemistry, and the sources of current used in electro-deposition and makes the underlying principles so clear that any one can understand the theoretical considerations on which all plating processes are based.

The interest of most readers will doubtless center in the main division of the volume—the practical part, which presents the industry in all its aspects from the arrangement of electro-plating establishments to actual methods used in the deposition of various metals. Price, $7.50.

This book can be obtained at the Aeronautic Library, 299 Madison Ave., New York City.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

Approximately ten thousand printed pages are covered by the minutes of the hearings of the latest Congressional investigations of the military aircraft expenditures, which totalled to over one billion dollars since 1917. *It is not surprising, therefore, that the Congressional Committee find it hard to make an adequate report of the situation in less than two hundred printed pages.* Aerial Age *is likewise limited by the amount of space available and will be forced to publish only a comprehensive digest of the hearings and conclusions of this latest Congressional investigation of aircraft expenditures.*

The reports of the Frear Committee will be printed first, in full. As regards the Manufacturers' Aircraft Association, this Committee found conditions to be identical with the conditions found by the Senate Investigating Committee summarized in Aerial Age *for February 9th and 16th and by Mr. Hughes in his* 1918 *investigation.*

This investigation does not, however, cover the charges of lobbying and other recent alleged pernicious activities of some misguided individuals who have turned Congress against the Aeronautical Movement by their ill-advised actions.

(*Continued from last week*)

Engineer Walker estimated logging-road construction, per mile, in that territory, at $11,000 (p. 826); Engineer Rempt estimated same construction at $11,610 (p. 829); Lightner, manager of the Goodyear Co. at Clallam Bay, testified that the 15-mile road would only reach a 440-foot elevation, compared with an 1,100-foot divide on the Carey road, and if built to haul a train of 30 cars, the largest operated, it would cost between $20,000 and $25,000 a mile. Such road would handle as many logs as the Carey road. This was the highest estimate (p. 879). Scott, whose mills produced a half million feet daily at Port Angeles and vicinity, testified that he had built 18 to 20 miles of road in the same neighborhood for $14,000 to $16,000 per mile (p. 910). Pendleton, 100 miles from the mainland in Canada, testified that his roads, built in 1918, to get out Canadian aeroplane logs cost about $15,000 per mile (p. 1256). Other witnesses testified to the same effect, estimating with 60-pound rails, the largest logging-road rails in use. The highest estimate for the 15-mile Clallam Bay railroad, completed, was $375,000.

The Siems-Carey-Kerbaugh 36-mile, $4,000,000, Crescent Lake road was built for commercial purposes to reach the same timber and not for logging purposes primarily, according to many witnesses. It cost the Government ten times what a properly built, properly located, logging road should have cost. The extra freight charges on Carey's 250,000,000 feet flitch contract alone, over the Milwaukee road to Sequim Bay, would reach approximately $400,000, and would have built the Clallam Bay line and saved $4,000,000, the cost of the Siems-Carey-Kerbaugh road as built.

Carey Planned An 80-Mile Rail Haul for Logs

A remarkable fact developed by the testimony (p. 2086) is that Carey planned to haul logs cut in the Lake Pleasant tract over this Government-built road a distance of 36 miles to Joyce Junction on the Milwaukee road and thence about 44 miles east over the Milwaukee road, to Sequim Bay—an 80-mile haul (p. 2827). No mills or manufacturing facilities existed at Sequim Bay, from which place the logs were to be rafted by Carey to the 40 mills on Puget Sound that he expected would enter into contracts to saw at his (Carey's) figures. This is specifically noted because a short 14- to 15-mile logging railway from Clallam Bay, as stated, according to abundant testimony, would have reached the same spruce in three months' time and at about 10 per cent of the cost of the Carey road and also as stated without a $400,000 freight tribute to be exacted by the Milwaukee road. Large expenditures were also in contemplation on the 44 miles of Milwaukee road main line from Joyce Junction to Sequim Bay at governmental expense (p. 2097).

Testimony was submitted by Col. Disque, Maj. Sawyer and Mr. Carey, all of whom knew practically nothing of logging or lumbering, attempting to show that rafting logs from Clallam Bay down the Juan de Fuca Strait, 15 miles wide, would be impossible for Carey, whereas he intended to conduct the same rafting operations from Sequim Bay on the strait and sound after an 80-mile expensive railway haul. Goodyear, and Merrill & Ring, both large loggers, had been successfully rafting for many years from Clallam Bay and Pysht Bay down the strait, while Pendleton rafted all of his Queen Charlotte Island logs from 100 to 175 miles across the roughest water on the upper Pacific coast and got production results never approached by Col. Disque.

The following from page 3162 of the hearings is specially relevant as to this railway:

Milwaukee Railway Commanded the Situation

It was the contention of the promoters of the Port Angeles & Grays Harbor Railway at Seattle that by his decision of routes Col. Disque had appropriated Muellers Pass and 20 miles of their railway between Lake Crescent and Lake Pleasant; that by connecting with the Milwaukee at Joyce the new line became a feeder of the Milwaukee and destroyed their own line, through the unlimited power of appropriation possessed by the Government alone during the war. Also that thereby the Milwaukee not only retained its Pysht Route over the Pysht Pass, but had destroyed any possibility of competition when the Government appropriated the Muellers Pass Route, which the Milwaukee presumably will eventually possess.

Carey placed Donovan, a Milwaukee Railway engineer, in charge of the Government railway surveying operations and Sawyer, the Milwaukee superintendent, in charge of its construction, while Donlan, mentioned in connection with former Ryan water-power interests and Anaconda Mining Co. logging operations, took charge of Carey's logging.

Mr. Ryan's Inspection Trip

Construction was begun on the Siems-Carey-Kerbaugh railway in June, and in July Director Ryan came out from Washington to Portland and Seattle and went over the Siems-Carey-Kerbaugh railway proposition which he had previously refused to approve and which was being constructed by Supt. Sawyer, of the Milwaukee. Mr. Ryan looked over the Carey railway operation in Clallam County, where several thousand soldiers were engaged with civilians in building the Siems-Carey-Kerbaugh railroad. He then returned to Washington, where he spent a week or so, after which he left for Europe some time in August, remaining abroad until October 13.

The Siems-Carey-Kerbaugh railway is about 250 miles from Portland headquarters, and farther away than any other one of the 12 Government-built railways; it is the only railway tapping the Milwaukee Railway system and is the only railway tapping the Milwaukee timber lands, in this case 2,000,000,000 feet of timber; it was the most costly road built per mile, according to the spruce officials (p. 1593); and it cost the Government several times as much as any logging road should cost if built merely to get out logs. This testimony before the committee was given by various witnesses. Mr. Ryan examined this road, but did not examine any of the 12 remaining roads.

A Quickening Song

In July and August, Director Ryan took his 6,000-mile inspection trip. He traveled across the continent to Seattle and across Puget Sound to where Carey's road was planned. The proposed Carey road, which he then inspected, was more distant and difficult of access than any other "spruce" operation. Coincidentally Director Ryan also inspected many sumptuous banquets arranged by Col. Disque for their mutual enjoyment (p. 3098). One function described by Capt. Cameron Squires (p. 1891), occurred in Portland toward the close of this banqueting trip in honor of Mr. Ryan. At the final feast a choir from among Col. Disque's distinguished officers sung a song designed to touch Director Ryan for a generalship for Col. Disque.

Though pitched in a major general key it only reached a minor brigadiership. However, at the conclusion of the war, Col. Disque, then a general, was installed through the influence of Mr. Ryan as president of the Amsinck Co., a corporation doing an importing and exporting business in New York City, a business of which he knew absolutely nothing (p. 1504), at a salary of $30,000 a year, or just 900 per cent increase over his captain's income of $3,000 two years before. To use Col. Disque's comprehensive expression, you must admit "that was going some" (p. 1504). The remarkable method of being warbled into a lofty Army promotion and later into a civil-life job, at twice the salary of the Chief Justice of the United States, is related at this point to show the vigorous vocal powers displayed by Col. Disque's distinguished medal division.

Again quoting from the hearings (p. 3162):

(*To be continued*)

NAVAL *and* MILITARY AERONAUTICS

Establish Special Air Service Schools

The Secretary of War has advised the Director of Air Service that authority has been granted to establish the following special Air Service Schools:

(a) Air Service Pilot School, Carlstrom Field, Arcadia, Florida.

(b) Air Service Pilot School, March Field, Riverside, California.

(c) Air Service Pursuit School, Rockwell Field, San Diego, California.

(d) Air Service Bombardment School, Ellington Field, Houston, Texas.

(e) Air Service Observation School, Post Field, Ft. Sill, Oklahoma.

The Course for Communication Personnel is also authorized at this school, Ft. Sill, Oklahoma.

(f) Air Service Engineering School, Dayton, Ohio.

The location of the Engineering School is dependent upon whether Congress authorizes the retention by the War Department of the plant and fields at Dayton, Ohio. This school will be located at the center of engineering activities of the Air Service, wherever that may be.

A course for enlisted storekeepers is also authorized at this School, Dayton, Ohio.

(g) Air Service School, Langley Field, Hampton, Virginia, including:

(1) A field officers' course.

(The course at the Air Service School (Field Officers' Course) will be limited to instruction which will fit the graduates thereof for the performance of duties that devolve upon officers of the Air Service as such, reducing the instruction in the tactics of other arms and in combined tactics to that necessary to qualify an Air Service Officer to function as an Air Service Officer. The General Service Schools are the only schools authorized to teach combined tactics.)

(2) An Airship School.

(3) A course in Aerial Photography for enlisted men.

(4) A course for enlisted balloon mechanics.

(h) Air Service Mechanics School for enlisted men, Kelly Field, San Antonio, Texas.

(i) Balloon School, Ross Field, Arcadia, California.

A course for enlisted balloon mechanics is also authorized at this school.

(j) Balloon School, Lee Hall, Virginia.

A course for enlisted balloon mechanics is also authorized at this school.

(k) Air Ship School, Brooks Field, San Antonio, Texas.

A course for enlisted balloon mechanics is also authorized at this school.

Engineering Division Have a New Test Furnace

The Material Section, Engineering Division, is supervising a test of the Government furnace at Shelby, Ohio. This furnace was installed during the war for the purpose of heat-treating steel tubing in quantities for aeroplane construction, but was not completed until recently. It is now completed and undergoing a series of tests to determine the feasibility of producing heat-treating steel seamless tubing of very high tensile strength and elastic limit, to particularly meet Air Service Specifications for axle tubing.

The furnace, located at the plant of the Ohio Seamless Tube Company, is 7 ft. in diameter and 22 ft. deep, electrically heated and automatically controlled so as to give constant temperature within very narrow limits. The tubing is lowered into the furnace, which is sunken so that the top of the furnace is level with the floor in a steel container (capacity 1,152 ft. of 2-in. tubing) by means of a crane. On reaching the required heat the container with its cargo is hoisted out of the furnace, transported over the quenching tank, where the bottom of the container is opened and the steel tubing, at the quenching temperature, is allowed to drop into the oil quenching bath.

The tempering operation is conducted in a similar manner, except that the maximum temperature of the tubing in the furnace is lower than it was for the quenching operation. These tempers run approximately 1,400° to 1,600° F. for the quenching operation and 400° to 1,000° for the tempering operation, depending on the quality of steel used and the physical characteristics desired.

This furnace will be used principally for the heat-treating of alloy steel tubing with special reference to the tubing used in axles. Up to the present time no axle tubing has been produced in quantities which will meet the requirements of Air Service Specification No. 10,229 calling for 200,000 lbs. tensile strength with 5 per cent elongation in two inches.

Capt. Arthur R. Brooks, D. S. C., in Command of 1st Pursuit Group, Kelly Field

Captain Arthur R. Brooks, formerly Commanding Officer of the 95th Aero Squadron has been placed in command of the 1st Pursuit Group, Kelly Field to relieve Major Reed Chambers who has requested that he be discharged at the expiration of his leave.

Captain Brooks is a graduate of the Massachusetts Institution of Technology and in civil life was engaged in electromechanical engineering. Shortly after the outbreak of the war he became identified with the Aviation Section of the Signal Corps and was sent to the University of Toronto, for ground school training and upon the completion of his training there he was sent to Hicks Field, Fort Worth, Texas. He was graduated and commissioned a 2nd Lieut, in January 1918 and shortly thereafter was sent overseas. After the prescribed course at Issoudon he became a part of the 139th Pursuit Squadron, 2nd Pursuit Group. He served through all the American campaigns and received a total of 6 German planes (official) and 4 unofficial to his credit. He was promoted to 1st Lieutenant and later to Captain and was awarded the Distinguished Service Cross for extraordinary heroism.

Claims for Damage Resulting from Operation of Aircraft

The Secretary of War directs that all claims for damages to persons and private property resulting from the operation of Army aircraft will be referred for primary action to the Commanding Officer of the nearest aviation station.

To enable action to be taken the claimant will be required to submit a statement, over his signature and address, setting forth all the facts and circumstances under which the damages claimed have accrued, the nature and extent of the damages, the date they were incurred and the cost for repairs of the same, which statement will be accompanied by such evidence as is available, including a receipt for the payment of repairs, if made, or any estimate of the cost thereof.

The Commanding Officer concerned will convene a board of officers who will investigate and report the circumstances under which the claim accrued, the date thereof, the nature and extent of the damages, and whether or not they were due to unavoidable accident, or due to fault of any officer or agent of the United States or any other person. The report will also include an estimate of the cost of restoring the property to the condition in which it existed before it was damaged, if such was the case, and deductions will be made for any improvement in such restoration. The report will conclude with a recommendation as to the amount which should be allowed and paid to the claimant for the restoration, excluding all charges or estimates for improvements, changes or additions to the property. The Board will reduce to writing all pertinent evidence submitted in behalf of the claimant and the Government. The claimant will be required to state in writing whether or not he will accept the award, and if not, to submit his reasons therefor, which statement will be made a part of the proceedings. The proceedings and recommendation of award, in triplicate, bearing the indorsement of the Commanding Officer, will be forwarded to the Director of the Air Service.

If the claim does not exceed $250, or if the claim exceeds $250 and the claimant agrees to accept $250 or less, action shall be taken by the Director of Air Service as provided in Act approved July 11, 1919. If claim exceeds $250 and if claimant declines or fails to accept an award of $250 or less, the proceedings shall be forwarded by the Director of Air Service to the War Department Board of Appraisers for action.

Convention Photographs Sent by Plane

San Francisco.—Photographs of the opening of the Democratic National Convention for Middle West newspapers were dispatched from San Francisco on the opening day of the convention in an army aeroplane to catch the Overland Limited train at Reno. The aeroplane was furnished by the army recruiting service and was piloted by Major Carl S. Spatz, one of the transcontinental flyers in the army endurance tests last fall.

All arrangements for the trip were made by the army recruiting service.

Flying time between Reno and San Francisco has been set by army authorities at one hour and forty-five minutes.

FOREIGN NEWS

Aerial Touring

A new leaflet has been issued by the Lep Aerial Travel Bureau giving full particulars of all the air services in operation at the present time. The Lep Aerial Travel Bureau are agents for all the air lines, and also supply taxiplanes for pleasure or urgent business journeys, the fare for flights of any distance being fifteen pence per mile per passenger (minimum of two), which certainly does not seem dear. It is noteworthy, too, that the fare on the Aircraft Transport and Travel Service to Paris has been reduced to £10 10s. single and £18 18s. return.

A feature that should especially appeal to Americans is the aerial tour of Shakespeareland, which is combined with a tour by car of the country in the neighborhood of Stratford-on-Avon, the whole thing being accomplished between 9 a. m. and 6.45 p. m. Then there is the Aerial Tour of the Battlefields; this is a three-days' tour, giving an unparalleled view of the whole of the Western Front from Zeebrugge to St. Mihiel.

Spain-to-France Air Service Inaugurated

Bilbao, Spain.—Aerial service between Bilbao and Bayonne, France, was inaugurated recently, when five aeroplanes arrived here from the latter city, one of the machines carrying M. Flanding, French undersecretary for aeronautic transport.

After a stay of five hours the machine returned to Bayonne without incident.

Commemorate Overseas Aerial Mail

Melbourne—To commemorate the first overseas aerial mail the Federal Government has issued a special stamp for 320 letters which Capt. Sir Ross Smith carried from England to Australia in his recent prize winning flight. The design is a flying aeroplane and miniature maps of Great Britain and Australia with a burning torch between. These stamps will be cancelled and the letters delivered.

Presentation of Aeronautical Material to Argentina

It is announced in the South American journals that the Belgian Government has presented to the representatives of the Argentine Government in Brussels a quantity of aeronautical material, including six 260 h.p. Mercédès engines, six 100 h.p. Anzani engines, and ten 50 h.p. Gnôme engines, together with airscrews suitable for the Mercédès and Anzani engines and a quantity of other material.

Taddeoli's Death: A Swiss Pioneer of Aviation

The pilots Frick and Taddeoli were taking part in an aviation display at Romanshorn. During his first flight, for which he had started at 2 p.m., Taddeoli fell from 400 metres. After having executed several spiral dives his machine broke up in the air. The wings, the propeller, the rudder and the seat fell down in the lake, entirely separated. Taddeoli and his mechanic, attached to their seats, were carried to the bottom of the lake by the weight of the machine. It is believed that the accident was caused by the propeller breaking off.

Emile Taddeoli was one of the oldest airmen in Switzerland. His ticket, of October 10, 1910, bears the number two. Taddeoli was then piloting a Dufaux biplane. At Lisbon and in Italy he took part in numerous meetings. In 1911 Taddeoli was present at Viry at the first aviation meeting. From Viry Taddeoli made flights over Geneva and Lausanne. The same year he built the "Hydromouette" (hydroseagull).

In 1913 Taddeoli left aviation, because the military authority would not allow married pilots to be employed. He then went to the Mors firm. But he kept up his love for aviation, and in 1916 he was to be found in Italy with his Swiss colleagues, Parmelin and Reynold, as an aviator instructor. In 1919 he crossed the Appenines and Alps on his seaplane, doing the journey from Sesto Calende to Geneva in two hours. At Geneva Taddeoli was attached to the Ad Astra firm. Taddeoli was 41 years old. The mechanician was Mr. Giovanelli, rigger at the Isotto-Fraschini, of Milan.

Much Aerial Activity in Peru

According to *Auto y Aero* of Santiago-Chile great activity is now apparent in the development of aviation in Peru.

A commercial air service along the coast, using Handley Page machines, is now about to be started.

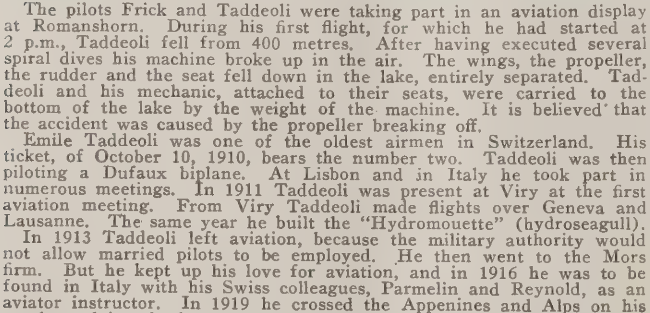
A flying school has been established by the Curtiss Company, and is amply supplied with Curtiss aeroplanes.

Commandant Lebaudy, chief of the French Mission, has held several conferences with the President regarding the initiation of aerial services in the country.

The Peruvian Government have purchased eleven aeroplanes from the French Mission. These machines are in charge of a North American pilot.

The military pilot Protzel, who recently obtained his ticket at Buenos Aires, has made a number of flights over Lima and Callao in his Farman.

Señors Espinosa, on a Bleriot, and Montoya, on a Farman, have also been active.



Lieut. Col. and Mrs. James E. Chaney, U. S. Air Service, starting in a balloon race held recently in Italy. Col. Chaney is on duty at the American Embassy, Rome

Prague to Paris in Quick Time

Capt. Deullin, M. de Fleurieu, and a mechanic, who recently flew from Paris to Prague and Warsaw, returned to Paris from Prague, the trip of 562 miles taking 5 hours 10 minutes. The pilot carried letters from the Polish and Czecho-Slovak Premiers to M. Millerand, and letters from the Prague Government to M. Benes, the Foreign Minister, who is at present in Paris, and to M. Deschanel.

Handley Page Records

United Kingdom and Abroad, May 1st, 1919—June 5th, 1920

Passengers carried	5,966
Freight carried	88,932 lbs.
Mileage covered	129,818 miles

Continental Air Service (in conjunction with Cie Messageries Aériennes)

September 2nd, 1919—June 5th, 1920

Passengers carried	1,510
Freight carried	87,439 lbs.
Mileage covered	115,097 miles

Handley Page in India

Although the Handley Page aeroplanes have only been operating in India for a short time, they have already carried there 1,245 passengers in addition to the pilots and mechanics.

Amongst well-known passengers who have flown in India in Handley Page aeroplanes are: The General Officer Commanding Presidency Brigade; General James and Staff; Admiral Sir H. Tothill and Lady Tothill, and Maharaja Thakore Saheb of Morvi.

Interesting Air Cargoes

A Handley Page Commercial Aeroplane on the London-Paris Service carried recently a consignment of nine gallons of Perfumes, valued at £505.

Another Handley Page machine carried in one consignment six Paris models (dresses), valued at 41,000 francs, whilst another interesting parcel containing a positive cinematograph film measuring 14,592 feet and weighing 80 lbs. was sent to Paris by Messrs. Gaumonts.

Air Route Is Needed in Andes

London.—Establishment of an aerial route from the Pacific to the Amazon as a means of surmounting difficulties of road travel among the Andes, is advocated by G. M. Dyott, until recently a squadron commander of the British Royal Naval Air Service.

"There is no serious difficulty in the way, so far as the scheme's practicability is concerned," Mr. Dyott told the Royal Geographical Society. "We have heard of the great height of the Andes, but there are low altitudes at which they may be crossed. One of the Andes ridges can be negotiated at a height of 7,000 feet, but there is another rising to 15,600 feet.

"Peru," he continued, "is peculiarly suitable for aerial traffic. Aerial highways undoubtedly will play a large part in the future development of that country. It is of importance that rapid communication should be established between the interior and the coast, and in order to do this the aeroplane must come to the rescue."

Discussing the difficulty of traveling by road, Mr. Dyott said that it took him five days to travel from one part in the Andes to another, whereas the aeroplane would cover the distance in 15 minutes, and in another stage of the journey it took him exactly a week to travel a distance which would be negotiated by the aeroplane in 30 minutes.

Montreal-New York Air Line

Plans have been matured to make the first experiment in the transportation of freight from Montreal to New York by aeroplane. The first cargo will consist of a collection of choice silver fox pelts, valued at over $100,000, and will be conveyed in two biplanes for delivery in New York. All the arrangements were made for the experimental trip by Mr. Harry Silbert, a millionaire American fur dealer, who bought the silver fox skins, which are the product of Prince Edward Island fox farms, at the recent fur auction sales in Montreal.

The aviators state the first aerial freight trip from Montreal to New York will be essayed soon. They expect to start at daybreak and reach New York the same afternoon, with only one stop. Special arrangements have been made with the American Customs to secure the entry of the valuable cargo.

The Training of Reserve Pilots in France

The question of training of pilots of the Reserve has been catered for in an order issued by the French Minister of War. For this year and during the period July 15th-Oct. 31st, pilots of the Reserve can, by application, fly at any of the schools and regiments mentioned hereafter:—

(a) Regiments de Chasse.—1st Regt., Thionville; 2nd Regt., Strasbourg; 3rd Regt., Chateauroux.

(b) Regiments de Bombardment.—1st Regt., Metz; 3rd Regt., Neustadt (for Bréguet pilots); 2nd Regt., Nancy (for Farman F.50 pilots); Detachment of the 2nd Regt., Luxeuil (for Voisin pilots).

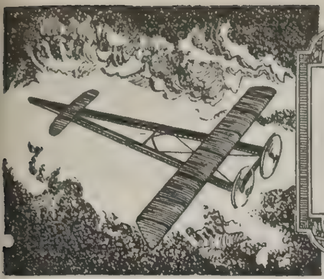
(c) Regiments d'Observation.—1st Regt., Tours; 2nd Regt., Dijon; 4th Regt., Le Bourget; 5th Regt., Lyon (for Salmson and Bréguet pilots).

(d) The Military Aviation School at Istres, near Marseilles (for Spad, Salmson, and Bréguet pilots).

Training flying may be carried out in one period of 15 days, two periods of 7 and 8 days, or 15 separate days, each counting as 24 hours. This arrangement agrees with the scheme laid down by the Ligue des Pilotes Aviateurs.

Applications addressed to the commandants of the regiments or schools must be received before July 1, 1920, and must give the surname, Christian names, grade and class of pilot, number of hours flown during military service, and a certified statement that they have not been derated by disciplinary measures, and also to state their desire as regards the period or periods of training. Every pilot during the course of his training will receive a sum which will cover general expenses during his stay in garrison, and will be entitled to a bonus calculated on the number of hours he has flown on military aeroplanes.

These are the arrangements made for this year, and the experience gained in them will possibly permit of their modification in 1921.



ELEMENTARY AERONAUTICS
and
MODEL NOTES

By John F. McMahon

"A Gasoline Motored Model Aeroplane"

Since the articles on Compressed Air & Steam Engined Models appeared in AERIAL AGE I have received many inquiries and requests regarding a Gasoline Motored Model. The proper type and size was generally requested.

Now there is no such thing as a proper type or size. These two things are governed by the plant to be installed and the purpose for which the model is intended.

I am not going to give a line drawing in connection with this article as I feel that the reader will be able to grasp the ideas conveyed herein by concentration and follow the instruction carefully.

We will begin with the general types of gasoline motors. Few model motors have proven successful in this country. This also holds for Europe. The reason is vibration, which cannot be overcome in a small motor. The vibration is such that it will jar the plant out of a model or break the members holding it. Many engines that have refused to run when installed in a model have run for from fifteen to twenty minutes when bolted to a test bench or stand. This showed that the motor would function properly, but owing to vibration would not run in the model.

Many leading aeronautic authorities and engineers worked on small gasoline motors of from one to four cylinders and horsepower ranging from one quarter to four horsepower in both two and four cycle. Many of these have worked but not in a model. One of the most successful was the "Baby" engine which was a one cylinder motor made of aluminum with a cast iron piston and aluminum connecting rod. This motor had no mechanical valves it being a two cycle affair. It was rated at one-half horsepower. Cooling fins were turned around the cylinder and a miniature spark plug was set in the center on top of the cylinder which gave a positive ignition to the compressed explosive charge. This motor weighed 18 ounces and developed its rated horsepower when running at 2000 R.P.M.

The company handling these little motors built a model patterned after the Voisin machine of 1912. This machine was somewhat like our present day machines but flew backward, that is the fuselage and tail works travelled ahead of the main planes instead of trailing after it as is the custom now. The elevator and stabilizing plane was in front and the motor in the rear something like the racing type of model.

The model referred to above was very light and measured about eight feet from tip to tip of the wings.

The makers claimed a flight of one mile with this machine. In order to keep it from flying out of sight, only sufficient gasoline was put in the tank to allow for a two minute flight.

The model builder could select for his model any of the present day types of machines all of which are suitable for a gasoline power plant.

A motor having two cylinders horizontally opposed with a one-inch bore and 1⅜" stroke mechanically operated valves in cylinder head with small spark plugs set in the head as well. Cooling fins should be turned in the cylinder every ¼ inch. These fins should be 3/32" thick and should extend from the cylinder head to the lowest point of piston travel to help in radiating the heat and keeping the engine cool. The piston should be of cast iron or steel with three grooves ⅛" wide for rings. These should be as light as possible and to keep down weight holes must be drilled in the skirt. The pistons should then be checked up, to be sure that both are alike in weight to insure against vibration.

The model I would suggest is the Curtiss J.N.4-B which, if constructed with a spread of 8 feet and all excess weight eliminated, will prove to be the best selection. The engine would of course be set in the nose of the machine and the center of gravity properly located before attempting to fly it.

Another type of model that would be adaptable to the gasoline plant would be the racing type of monoplane. This type of machine would be efficient because of the low resistance, and if the model should make a hard landing would not suffer as much because of the fact that the body in front of the motor would be a protection.

Details of Construction

This applies to all models discussed on this page and not to the model described above alone.

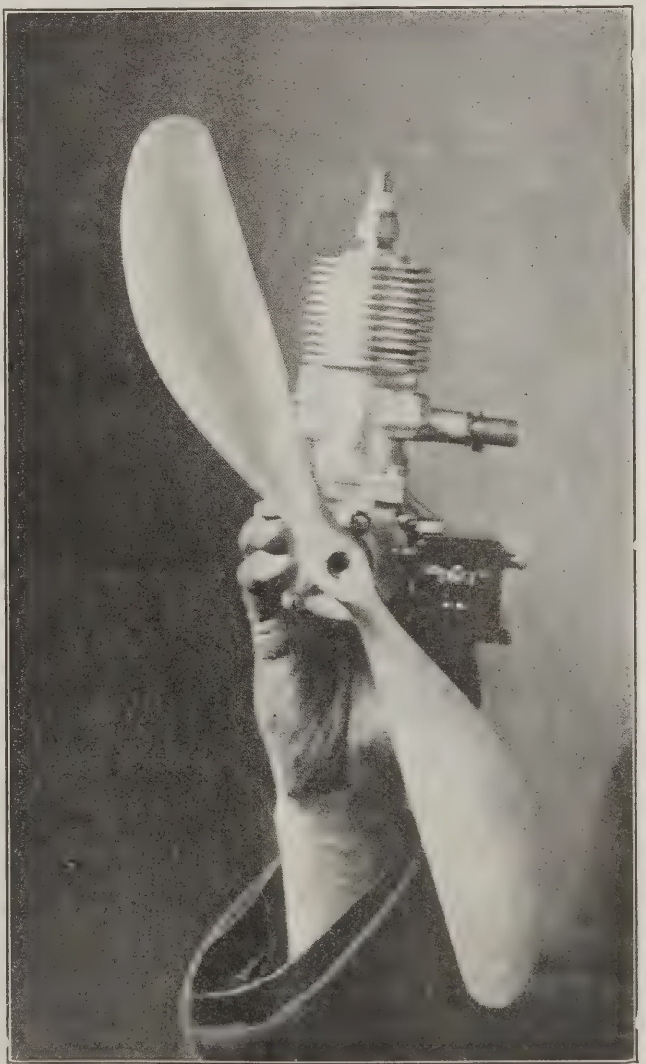
The following paragraphs are answers to some readers' questions but should be interesting to others as well.

When constructing a model and using solid ribs, they should be cut out of thin wood not more than 1/16 inch thick. These can be kept to the same shape and size by making a master rib or template drilling two 1/16" holes where the spars are to be located and marking the others out with a pencil to the same outlines and cutting out with a scroll saw or knife. A pencil point shoved through the holes will locate the points for the spars.

For round spars ⅛" in diameter a hole this size is drilled, but for square holes this size, a ⅛" hole is drilled first and followed up by squaring with a wood chisel. This chisel can be procured in any hardware store. If the ⅛" chisel cannot be obtained a ¼" one can be ground down to ⅛ inch.

The spars are then easily passed through these holes and a little glue will hold them in place.

For fastening struts to these spars, terminals are made from a strip of brass 1/32" thick or less, ⅜" long and 3/16" wide with a 1/32" hole at each end. To this strip a ⅛ inch length of 3/16" O.D. tubing is soldered forming a cup to receive the end of the strut. A pin can pass through the cup and end of strut if necessary, but this is not necessary as the bracing wires will hold it in place. Where the round spars are used the fitting can be wrapped around it and fastened, and where the square ones are used they can be nailed flat.



½ h.p. Midget Gasoline Motor

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Castles

We build our castles in the air,
  In youth's impulsive season;
A place of visions bright and fair,
  Beyond the bounds of reason.

We fill our lives with sordid care,
  Till Fancy's hold relaxes;
And find our castles in the air
  Have all been sold for taxes.

D. M. D.

A colored blacksmith recently announced a change in his business as follows:

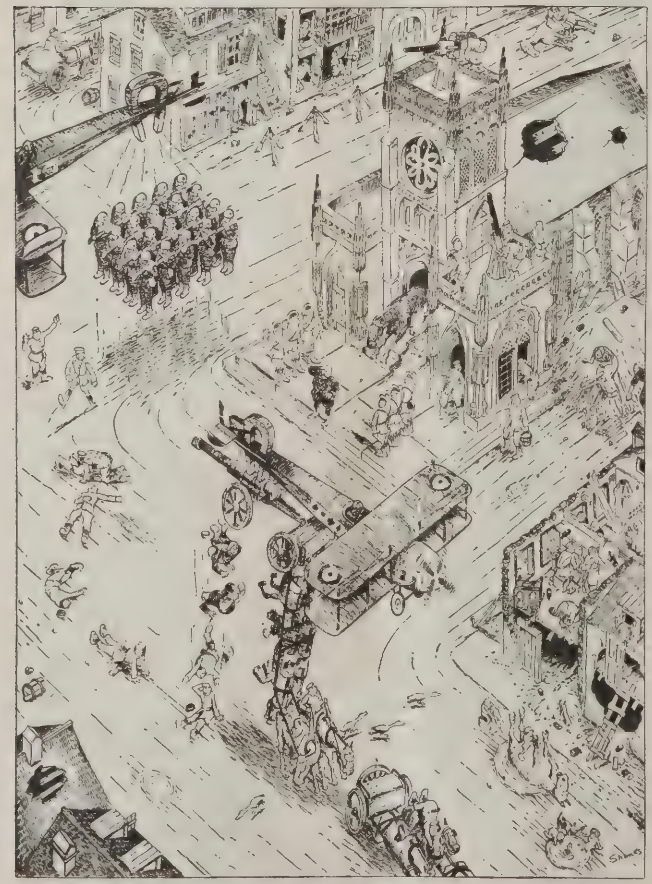
"NOTICE"

De pardnership heretofore resisting between me and Mose Skinner is hereby resolved. Dem what owe de firm will settle wid me, and dem what de firm owes will settle wid Mose.

What Do You Mean?

Aviator—"Are you fond of nuts?"
His girl friend—"Is this a proposal?"

UNPUBLISHED PICTURES OF THE WAR



Those clever aces, Zoom and Sideslip, pick up a few Jerry prisoners

Courtesy "American Legion"

The Observer's Lament

Allen Crofton, ex-lieutenant, U. S. A., Air Service, recalls that "around the airdromes of France there oft-times sounded this whimsical wail, familiarly known as 'The Observer's Lament'":

I want to go home, I want to go home.
The gas tank is leaking, the motor is dead,
The pilot is trying to stand on his head;
I don't want to fly upside down,
I wish I was safe on the ground.
Oh, my! I'm too young to fly;
I want to go home.

I want to go home, I want to go home.
The Pfaltzes they murder, the Fokkirs they kill,
If the Rumples don't get you the Albatross will.
I never a birdman should be,
No "Eyes of the Army" for me.
Oh, my! I'm too young to die;
I want to go home.

—*National Service.*

Enough Said

A gob offered his doubting pal a drink of home brew.

"Is it good stuff?" he inquired.

"Good stuff," the gob chirped. "Say, one drink will give you a headache. Two drinks and you will leave footprints on a steel deck. A third drink is unnecessary."

We Want to Know

A man imprisoned in Los Angeles is said to have 20 wives. What we want to know is, if he is in jail for protection or punishment?

A Modern Necessity

Father (upstairs): It is time for that young man to go home.

Aviator: Your father is a crank.

Father (overhearing): Well, when you don't have a self-starter, a crank comes in mighty handy.—*Panther.*

Just a Matter of Pronunciation

Protecting an absent buddy by answering to his name at roll call has been one of the commonest yet riskiest practices in the Army.

At reveille one winter morning Lieutenant Jones started calling the roll. "Privates White, Casey, Smith, J. S." etc., and "Here, sir," answers came back in snappy fashion. Then "Private Erskomborgeroski" and back came "Here." Just then Erskomborgeroski came shuffling down the street, squeezing his way into the squad.

Grabbing a red-faced Irishman by the arm, the lieutenant asked, "What do you mean by reporting for another man?"

"Beg your pardon, sir; I thought you said O'Brien."—*The Red Diamond.*

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Let us help you in your selection of aeronautic books to read during the summer. The following are the leading and most valuable available at this time:

	Postpaid
AIRCRAFT MECHANICS HANDBOOK, Colvin	$3.30
AEROPLANE CONSTRUCTION & ASSEMBLY, Leslie & King	1.70
AEROPLANE CONSTRUCTION & OPERATION, Rathbun	2.75
THE A B C OF AVIATION, Pagé	2.75
THE AERO BLUE BOOK, Woodhouse	5.35
TEXTBOOK OF NAVAL AERONAUTICS, Woodhouse	6.50
TEXTBOOK OF MILITARY AERONAUTICS, Woodhouse	6.50
TEXTBOOK OF APPLIED AERONAUTIC ENGINEERING, Woodhouse	6.50
HOW AN AEROPLANE IS BUILT, Blakeney	2.25
AIRPLANE DESIGN & CONSTRUCTION, Pomilio	5.40
ELEMENTARY PRINCIPLES OF AEROPLANE DESIGN, Judge	3.30
AEROPLANE STRUCTURES, Pippard & Pritchard	6.40
HANDBOOK OF MODERN AERONAUTICS, Judge	8.00
APPLIED AERODYNAMICS, Bairstow	11.00
THE DESIGN OF SCREW PROPELLERS, Watts	8.50
AIR NAVIGATION, NOTES AND EXAMPLES, Card	3.70
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THE WAY TO FLY, "Avion"	1.40
TOPOGRAPHIC MAPS & SKETCH MAPPING, Finch	2.75

	Postpaid
AEROBATICS, Barber	$3.30
PRACTICAL FLYING, McMinnies	2.25
HOW TO FLY AND INSTRUCT ON AN "AVRO", Hobbs	1.40
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AIRPLANE PHOTOGRAPHY, Herbert Ives	4.30
LANDING FIELD GUIDE & PILOT'S LOG BOOK, Eytinge	2.25
THE TEXTBOOK OF AERO ENGINES, Sherbondy & Wardrop	10.50
THE DESIGN & CONSTRUCTION OF AERO ENGINES, Sylvester	2.75
MOTOR VEHICLE ENGINEERING, Favary	3.75
MOTOR VEHICLES & THEIR ENGINES, Frazer & Jones	2.25
AIRCRAFT OF ALL NATIONS, Woodhouse	.30
THE BOY MECHANIC, BOOKS 1, 2 and 3, each volume at	2.40
MODEL FLYING MACHINES, Morgan	.40
TAM O'SCOOTS, Wallace	1.80
PAT CROWE, AVIATOR, Lt. J. R. Crowe	1.70
ABOVE THE BATTLES, André	1.70
FIGHTING THE FLYING CIRCUS, Rickenbacker	1.70
THE MAN FROM THE CLOUDS, Clouston	1.95
FIVE YEARS IN THE R. F. C., McCudden	2.75
LUCK ON THE WING, Haslett	3.30

If you wish to keep informed of new books as they are published, send in your name and address, and we shall be glad to enter it on our mailing list. We also carry aeronautic maps, model flying aeroplanes, aviation novelties, such as jewelry, statuettes, propeller knives, radiator cap attachment of the D. H. 4 biplane for automobiles, propellers of wood or aluminum, etc.

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that

We are consolidating our laboratories, engineering, and executive offices, in order to facilitate better production and thereby meet the demand for the FAIRCHILD AERIAL CAMERAS AND ACCESSORIES.

On and after July 1, our address will be:

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NEW YORK CITY

Our Service Department is ready at all times to co-operate with you on your aerial photographic problems.

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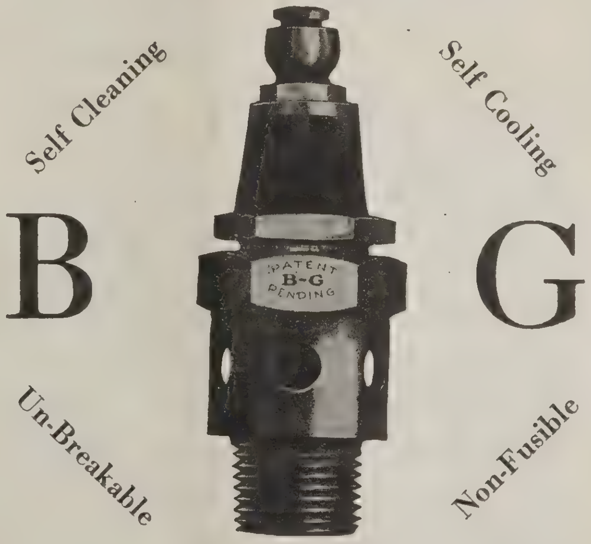
"The Spark Plug That Cleans Itself"



"The Plug with the Infinite Spark"

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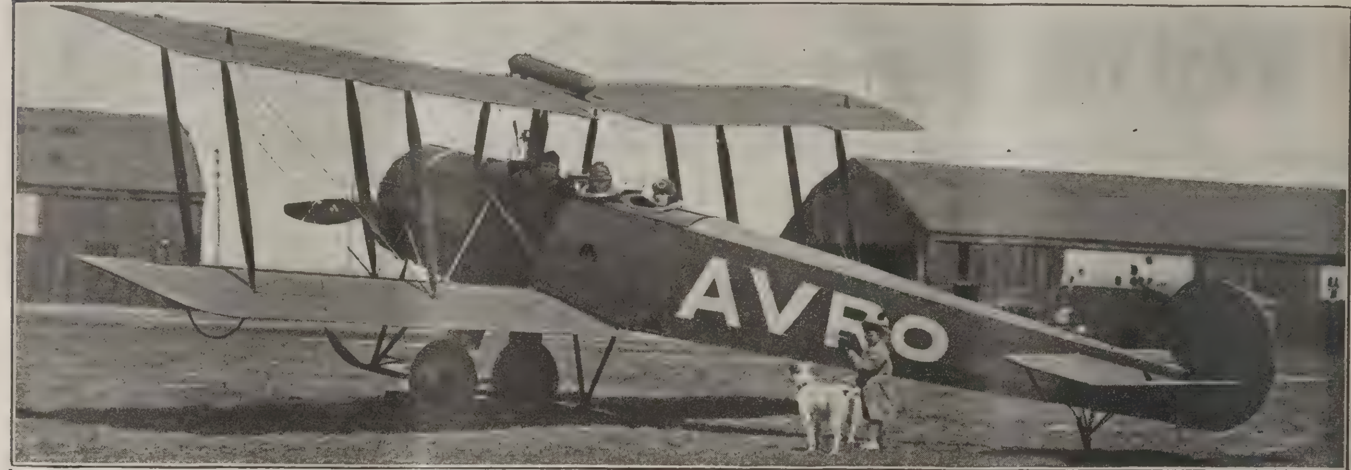

We have a few slightly used two-passenger Avro aeroplanes for immediate delivery. Inspection can be made at our shops by appointment. Prices $3,000 F.O.B., N. Y. Attractive discount on quantity purchases.

SPECIFICATIONS: MODEL 504K

Wing Span	36 feet
Height over all	10 feet 5 inches
Length over all	29 feet
Weight Light	1230 pounds
Useful Load	Up to 750 pounds
Engine—Le Rhone	110 H.P.
Gasoline Tank Capacity	33 gallons
Oil Tank Capacity	7 gallons
Speed	37-95 miles per hour
Cruising Speed	80 miles per hour
Cruising Radius	250 miles

Equipment: Tachometer, Air Speed Indicator, Altimeter, Compass, Oil Gauge, Gasoline Gauge, Air Pressure Gauge and Tools.

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Machines manufactured in Great Britain: thoroughly tested before shipping to this country.

To introduce this line a limited number are available at manufacturer's cost—immediate delivery.

Write for specifications and full particulars of this and other standard types of planes.

Amerada Engineering Corporation *Suite 535, 30 Church Street* **New York**

(*Continued from page* 608)

1. That the "cross-license" scheme was executed by the Manufacturers Aircraft Association under the cover of the National Advisory Committee on Aeronautics, *before and not after* submitting it to Government officials for approval.

2. hat when it was submitted for approval to Government officials it was represented as a project originated by the National Advisory Committee on Aeronautics for the purpose of saving the Government money, as will be noted by the following letter which Secretary of the Navy Daniels wrote to Dr. W. F. Durand, on August 23rd, 1917, which follows:

"August 23, 1917.

"Dear Dr. Durand:

"I beg to acknowledge receipt of your letter of July 27th, 1917, informing me of the settlement of the aircraft patent situation reached by the manufacturers of aircraft and enclosing a copy of the 'Cross-License Agreement and License' as drawn up by that Association.

"I wish to thank you and the members of your Committee for the assistance which has been rendered to the Navy by the guidance of the various manufacturers towards amicable settlement of the perplexing patent situation, thereby rendering it unnecessary to spend the appropriation of $1,000,000, included in the Naval Appropriation Act of the fiscal year 1912, for the purchase or condemnation of basic aeronautic patents.

"Very truly yours,
(signed) "Josephus Daniels,
"Secretary of the Navy.

"Dr. Wm. F. Durand, Chairman, Nat'l Advisory Committee for Aeronautics, Munsey Building, Washington, D. C."

The accounts to date show that instead of saving the sum of one million dollars referred to by Secretary Daniels, the scheme perpetrated by the agents of the Association has already cost the Government over two million dollars and the Government is still under obligations to pay, unless steps are taken to stop this conspiracy.

3. That manufacturers were coerced into agreeing to this destructive project and to the violation of laws enacted by Congress by agents of the Manufacturers Aircraft Association *in the name of the Government.*

Those who complained were made the objects of destructive discriminations intended to drive them out of business.

4. It is not known that the so-called "cross-license" scheme was executed hurriedly immediately *after* Congress appropriated the huge sum of $640,000,000 for military aeroplanes, and was "put over" Government officials by the agents of the Manufacturers Aircraft Association by misrepresentations to the effect that the Government and manufacturers and users of aeroplanes would only have to pay $25.00 per aeroplane after the war; and by statements which have since proven to have been falsehoods, to the effect that the payments to be made to the Association would cover all aeroplane patents.

(13) Whenever there were objections expressed against it, the "cross-license" scheme was always represented as an emergency war measure, intended to save money to the Government. The fact that Congress had authorized only the purchase of the patents and had appropriated the sum of $1,000,000 for the purpose, which would have saved the public close to two million dollars, was always hushed. Requests for copies of the secret agreement which formed the basis for the "cross-license" scheme were refused and as the report of the Senate Invstigating Committee subsequently proved, conspiracies were started against people who dared to inquire into the details.

(14) But the criticisms continued and complaints were made to Congress. It is evident that to meet these complaints the individuals who were responsible for perpetrating this costly scheme on the Government under misrepresentations, contrived another scheme of misrepresentation to create the appearance of legal approval of their scheme from the Attorney General. They prepared a well-worded request for legal opinion to be submitted to the Attorney General through the Aircraft Production Board, in the name of the Secretary of War, who, it will be recalled, was a very busy man at the time. The scheme was represented as being an emergency war measure intended to save the Government large sums, and the Attorney General was asked to state whether in his opinion the plan conflicted with the anti-trust laws or could be considered as a restraint of trade. The Attorney General found, naturally, that the plan to save the Government money, was

legal. But the Attorney General had to take for granted that the representations made to him, to the effect that the plan would save money for the Government, were correct, and he was not asked to, and he did not pass on, the legality of the scheme if it failed to save the Government money or if it involved the Government in the payment of huge sums, far higher than what Congress had appropriated for the purpose of purchasing the patents outright.

(15) As a matter of fact, the Attorney General was not asked to consider whether the fact that Congress had only authorized the purchase of aeroplane patents under certain conditions would not preclude legally the entering into an agreement with the Manufacturers Aircraft Association on any basis. This matter was not at all brought to the attention of the Attorney General when he was asked to advise whether the formation of the "cross-license" plan for the purpose of saving the Government money would, per se, be legal.

(16) Nor was the Attorney General requested to give his opinion as to whether the scheme would be legal if it failed to save the Government money through the efforts of the schemers we had proposed the plan to the various departments by misuse of the name of the National Advisory Committee on Aeronautics and misrepresentation of their objects in presenting this scheme in the name of the National Advisory Committee on Aeronautics.

(17) It is well to point out that the Attorney General was asked to consider the legality of the plan some months before payment for royalties were made to the Manufacturers Aircraft Association, and neither he nor the Secretary of War nor the Secretary of the Navy were aware of the fact that the scheme had been originated by the Manufacturers Aircraft Association's representatives, acting on the Sub-Committee on Patents of the National Advisory Committee on Aeronautics, and that it is evident that it was reported by them, in the name of the National Advisory Committee on Aeronautics, without the knowledge of the Army and Navy officers acting on that committee, to the Aircraft Production Board and the Council for National Defense, and that it was misrepresented to all these Government Committees and Board as a plan of the National Advisory Committee on Aeronautics to save the Government money in settling the aeroplane patents problems.

(18) No payments had as yet been made for royalties on aeroplane patents to the Manufacturers Aircraft Association or to manufacturers on war orders at the time when the Secretary of War, the Secretary of the Navy, the Attorney General, the Council of National Defense and the Aircraft Board were asked to approve the "cross-license" scheme proposed through the National Advisory Committee on Aeronautics by the representatives of the Manufacturers Aircraft Association, in the name of the Committee. The Attorney General rendered his opinion on October 6th, 1917, and he was not advised that his opinion would be used as authority for paying millions of dollars in royalties for aeroplane patents which Great Britain had bought outright for only $95,000, and that his opinion would be used as authority for paying close to one hundred thousand dollars in royalties for the 464 training aeroplanes manufactured for the War Department and delivered between July and October, 1917, therefore he would be authorizing the payment of as much money in royalties on a preliminary order of training aeroplanes as the British Government had paid for the purchase of the Wright and Curtiss patents to cover the production of all the training, fighting, bombing, and other types of aeroplanes used for the conduct of the entire war by Great Britain; and later his opinion would be misused to secure payments of royalties on 15,000 aeroplanes.

(19) As Congressmen have stated, it is evident that the Attorney General could not have authorized a scheme intended to supersede an Act of Congress, especially when the scheme involved the Government into much larger expenditures of public money than the plan authorized by Act of Congress.

Congressmen have, during the last year, seen the depth of the conspiracy connected with the "cross-license" agreement and the criminal conspiracies and restraint of trade practice and other evils perpetrated by the authors of this scheme and this subject is one of the subjects which the Attorney General is authorized to investigate under the Congressional Resolutions of April, 1920.

Representatives of the Manufacturers Aircraft Association have used large sums from the funds obtained from the execution of the "cross-license" scheme, to promote criminal conspiracies to discredit and destroy the business of patriotic men who in the discharge of their patriotic duties have had occasion to inquire into the Manufacturers Aircraft Association's scheme.

The information given in the recent affidavits of members of the Association contains specific admissions which will serve, I believe, as connecting links to prove that the United States Government was defrauded of large sums by the Manufacturers Aircraft Association.

I am ready to present the evidence in the case to the Grand Jury and hope it will be possible for the Department of Justice to institute the investigations before the Grand Jury in the near future.

I am also ready to present evidence regarding another case not yet investigated by any of the Government investigating bodies referred to, which shows how a group of individuals who have been cooperating with the Manufacturers Aircraft Association in attempts and plots to suppress evidence, obtained several million dollars of public funds through conspiracy and misrepresentation.

Awaiting instructions I remain,

Yours very sincerely,
(Signed) HENRY WOODHOUSE

Tests of Fokker Aeroplane Chassis

Tests for strength have been made at McCook Field on the chassis of a Fokker aeroplane.

The chassis struts are seamless steel tubing of streamline section. Into the upper end of the strut is welded a ball which fits into a cup on the longeron. A bolt passing through both ball and socket holds the strut securely in place.

The struts are welded at the lower end to a box-shaped structure which also forms the support of the shock absorber. To this box is riveted an aluminum alloy cross member. The axle, which is 2 11/64 in. outside diameter, 0.160-in. wall steel tubing, moves inside this cross member.

The axle fairing has a section similar to that used for the wings, so that it acts as a lifting surface, contributing about 4 per cent of the effective lift.

Spiral steel springs, built up and wound on the tubes and axle in a manner similar to that employed with elastic cord, furnish the shock-absorbing medium.

The chassis, complete with wheels, tires and axle fairing, weighs 110 lbs.

The action of the coil spring in absorbing shock does not seem to be as satisfactory as that of elastic cord. It was noted that when the load was removed the axle returned immediately to its original position, in contrast with the lag noted in tests where elastic cord was used.

The strength of this chassis is well above the average for aeroplanes of this type. The unusually high strength, moreover, is obtained with only a slight increase in weight. Allowing 10 lb. for the weight of the lifting surface construction, the net weight of 100 lbs. is the same as that of the Ordnance Type "D" and only 10 lb. more than that of the Curtiss-Kirkham biplane.

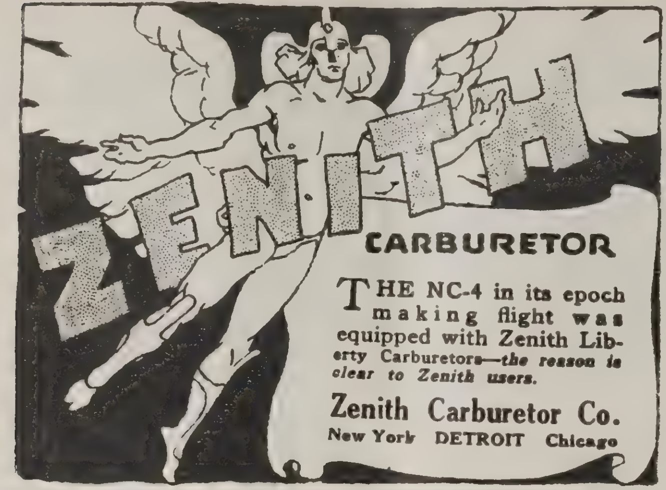
Aerial Mail Experiments in New Zealand

Aerial activity in New Zealand has been somewhat pronounced lately, and on present indications it will be even more so in the near future. The experiments on the carriage of mails between certain towns has been extended and trial flights are being made.

The Postmaster-General (Hon. J. G. Coates) has made arrangements with Walsh Brothers and Dexter, of the New Zealand Flying School, Auckland, for experimental flights for the carriage of mails extending over a period of a month or two months between Auckland and Thames, Whangarei and Dargaville, and these flights have already been commenced. The idea of the services is rather to demonstrate the practicability or otherwise of regular services than in the expectation of making the trips self-paying. When regular trips are established it is proposed to make special rates of postage for mails carried by air.

There are in New Zealand many districts which by reason of their isolation have to wait some days for their mails, and if some arrangement could be made to enable bags containing mails to be dropped as the seaplanes pass over the towns, as was done at Helensville in the trial trip between Auckland and Dargaville last December, it would be a great boon to the settlers.

A report on the flights on March 10th stated that an aeroplane carrying bags containing 950 letters, 60 newspapers, and three packets left Auckland on March 9th at 10 o'clock and arrived at Dargaville at 11:50 A. M. On the return trip to Auckland, which was made at 2:30 P. M., bags containing 460 letters, 20 newspapers, and 8 packets were carried, the plane reaching Auckland at 3:30 P. M. Mails were dropped at Ruawai on the way, and towns similar to this will benefit if regular services are established; for in some instances the settlers only receive mails once or twice a week.



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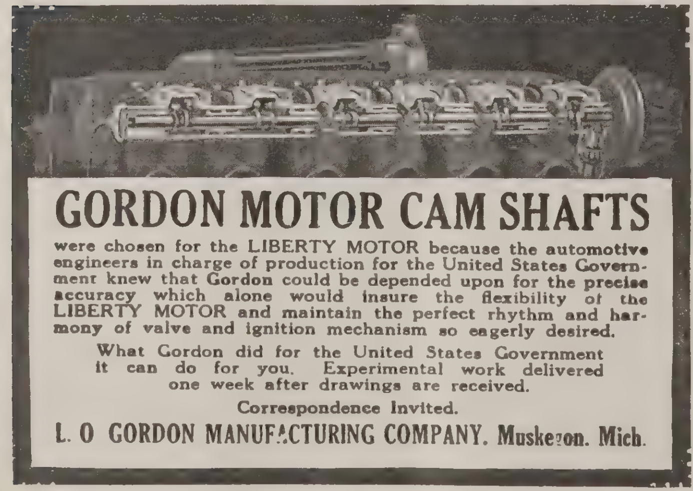

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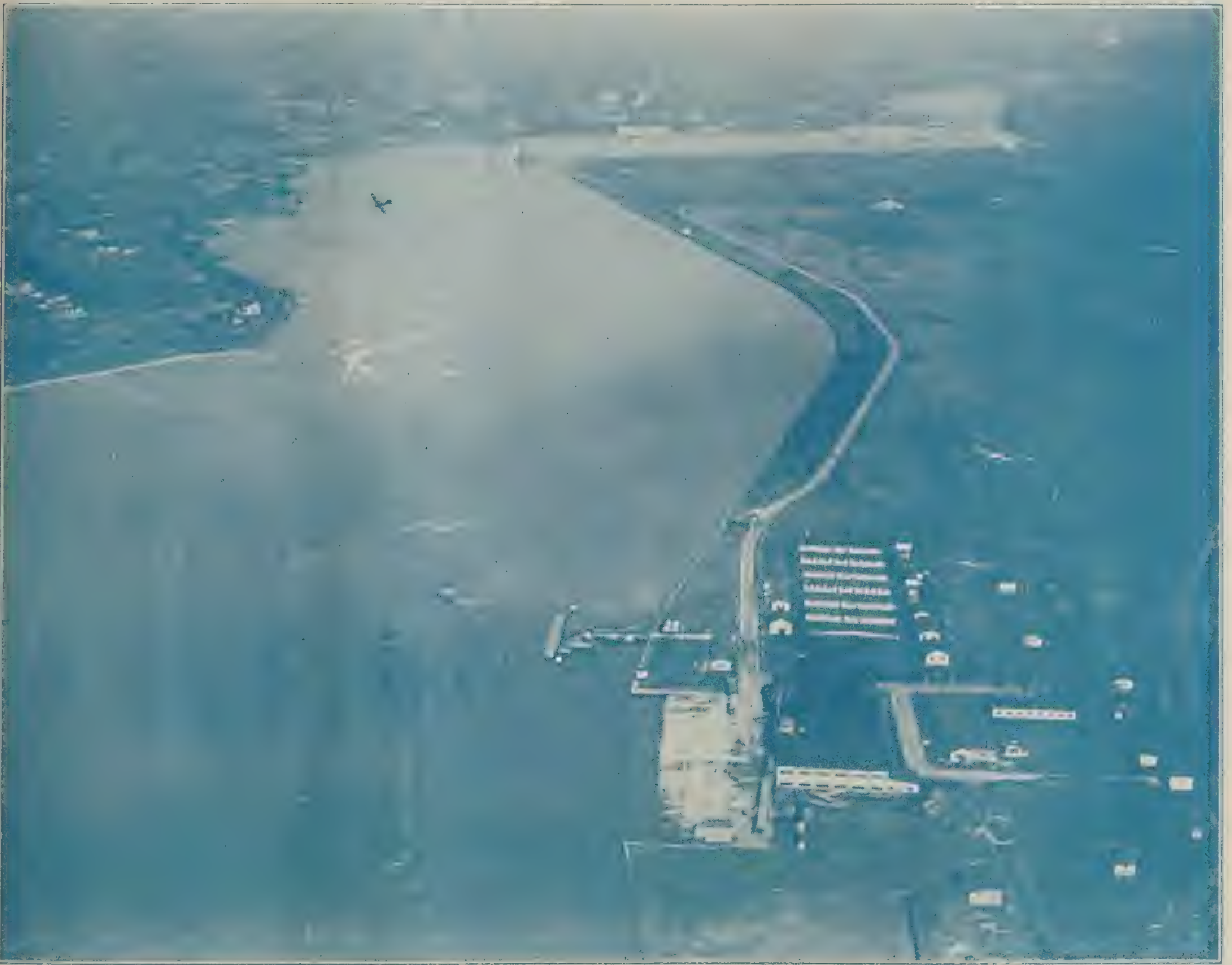

Airscape of the U. S. Naval Aviation Station at Anacostia and Bolling Aviation Field

Manufacturers Aircraft Association Misrepresents Patent Situation

LISHED WEEKLY BY THE AERIAL AGE COMPANY, INC., FOSTER BUILDING, MADISON AVENUE AND FORTIETH STREET, NEW YORK CITY
criptions: Domestic, $4; Foreign, $6 Entered as second-class matter March 25, 1915, at the Post Office at New York under the act of March 3rd, 1879

In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

Aerial Transport Service

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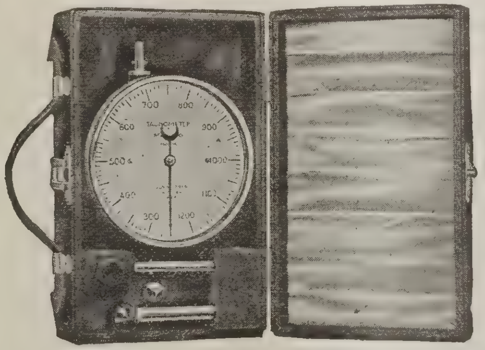
The Jones Aeroplane Tachometer comprises the Standard Jones Head, which is being widely used in commercial fields. This instrument is particularly adapted for use on special testing outfits, such as magneto and dynamometer test sets, etc. The dial is evenly spaced throughout, thus making possible quick and accurate readings of revolutions per minute.

The Jones Aeroplane Tachometer can be driven either by flexible shaft or belt, as preferred.

We have designed the *Jones Hand Tachometer* especially for portable use. This instrument has proven invaluable in *Cotton* and *Paper Mills* and *Machine Shops*, etc. A special disc, one foot in circumference, can be supplied to show peripheral, or surface speed in feet per minute.



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AERIAL AGE WEEKLY

VOL. XI JULY 19, 1920 NO. 19

TABLE OF CONTENTS

PAGE

Manufacturers Aircraft Association Misrepresents Patent Situation... 639

The News of the Week............ 641

U. S. Aerial Express Passenger Cruisers..................... 642

The Aircraft Trade Review....... 643

Postoffice Department Issues Call for Proposals for Operation of Aerial Mail Routes............ 644

The Henri Potez Aeroplanes...... 645

Hammondsport Again Aeronautic Center 646

Method of Navigating Aircraft.... 647

Preliminary Report on Free Flight Tests......................... 649

Naval and Military Aeronautics... 651

Foreign News.................... 652

Elementary Aeronautics and Model Notes 653

Aeronitis 654

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures............ 658

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MANUFACTURERS' AIRCRAFT ASSOCIATION MISREPRESENTS PATENT SITUATION

DURING the past week the few individuals who still call themselves the Manufacturers' Aircraft Association issued another misleading statement, this time misrepresenting the aeroplane patent situation for the purpose of worrying the hundreds of progressive owners and distributors of "surplus" aeroplanes who are the backbone of the aeronautic industry.

The methods adopted in this case are like the methods which led the U. S. Senate Investigating Committee to condemn the Manufacturers' Aircraft Association during the war as **"vicious and designed to reap large profits by taking advantage of the necessities of the Government."**

It will be recalled that after the Senate's disclosures had been made public, Congressmen and Government officials believed that the exposing of the Association's unpatriotic and selfish scheming would lead to dissolving the Association as recommended by the Chairman of the Senate Investigating Committee.

Instead of dissolving, the Association's agents bent their efforts to engineering conspiracies to suppress evidence of their irregularities, using for this purpose funds which had been obtained by the Association from Government agencies by the misrepresentations referred to in the letter to the Attorney General, printed in the last number of AERIAL AGE. They spent these funds in pernicious lobbying, plots to destroy the business of those who were known to have evidence of their unlawful activities in restraint of trade practice in trying to stop civilian aeronautic activities so as to give credence to their unfounded statements regarding civilian aeronautic business, and spreading false reports regarding aeronautic appropriations of other countries, the last two for the purpose of securing unwarranted Government subsidies.

The country as a whole was most indulgent and stood for a lot of the pernicious activities of the Manufacturers' Aircraft Association's agents. Then Congress turned, and as it did not have the time to conduct another investigation it adopted the policy of refusing to grant appropriations for aeronautics and four army, navy and aerial mail appropriations were refused. What followed was told in AERIAL AGE for February 9 and 16, 1920, when AERIAL AGE was compelled by duty to deviate from its policy of not printing reports of wrongdoings, and found it necessary to make known the facts about the activities of this vicious clique who, after taking advantage of the Government in time of war, attempted to continue its pernicious activities.

The M. A. A.'s Latest Misrepresentations Regarding The Patent Situation

The misrepresentations of the agents of the Manufacturers' Aircraft Association have been many and would fill a large volume. Hundreds of printed pages of the reports of the Congressional investigations and hearings stand as evidence that the Association's agents persisted in circulating statements which were deliberate distortion of facts, so as to obtain certain financial advantages for the purpose of furthering their schemes and conspiracies against the Government and against patriotic organizations and individuals. The details of some of these misrepresentations were given in AERIAL AGE for February 9, February 16, July 12.

We quote herewith from the statement as sent to the newspapers by the Manufacturers' Aircraft Association which deliberately misrepresents facts and attempts to mislead in conclusions.

The statement as issued by the Association reads in part as follows:

"Fundamental American aeroplane patent rights—as granted originally to Orville and Wilbur Wright—have been upheld decisively against foreign infringement by a decree of international significance by Judge Thomas I. Chatfield in the Brooklyn Federal Court, it was announced today.

"The decree, which perpetually prohibits the Interallied Aircraft Corporation, of New York, from using or selling aeroplanes in this country is certain, American manufacturers declare, to have a profound effect on the controversy over the dumping into the United States of foreign built, obsolete aeroplanes which has engaged Congress and the country for several months.

"The Wright Aeronautical Corporation, of Paterson, N. J., owner of the Wright patent in the United States, which won the suit against the Interallied, has a similar suit pending against the Aerial Transport Corporation, incorporated in Delaware.

"The Curtiss Aeroplane & Motor Corporation of New York also announces that it has begun litigation against the Aerial Transport Corporation for violation of fundamental Curtiss patents in the United States.

"The Aerial Transport Corporation has been the center of activity in the plan to throw into the United States thousands of obsolete British built aircraft and engines at prices so low that, were general distribution successful, the American industry, it is asserted, would be practically put out of business. It was stated by representatives of the company at a recent Congressional hearing that the Aerial Transport Corporation had an option on half of the British surplus which is understood to be 15,000 aeroplanes and 20,000 or 30,000 engines.

"The Chatfield decree, American aircraft manufacturers state, makes clear that the basic Wright idea which made flight possible in heavier-than-air machines, cannot be copied in this country, notwithstanding the fact that the foreign privilege of using the Wright invention was sold or leased to foreign interests. The patent involved in the Chatfield decree was U. S. Patent No. 821393, which covers the Wright means for maintaining and restoring lateral equilibrium whether by warping the wings or by ailerons or otherwise.

"Rights to the invention in certain foreign countries, including Great Britain and France, were granted to companies in these countries. The British Wright Company, owner of the British patent, in a statement in the *Aeroplane* for Oct. 4, 1916, announced that it had settled with the British Government, on payment of £15,000 (pounds) for past, present and future use of the British patent on all British Government machines. The company, however, reserved to itself the British rights for sporting and commercial purposes.

"There have also been payments of very substantial royalties by practically every French manufacturer of aeroplanes during the war to the French Wright Company, amounting to millions of dollars, according to statements which appeared in the newspapers here of January this year."

Manufacturers' Aircraft Association Guilty of Gross Misrepresentations

Before commenting on the Association's statement we reproduce herewith the statement of Mr. John Inwood, Manager of the Interallied Aircraft Corporation to Aerial Age, which follows:

"*July 12, 1920.—My attention has been called to the misleading newspaper reports in connection with the recent suit of the Wright Aeronautical Corporation against the Interallied Aircraft Corporation.*

"*From the various press reports which I have read it would appear that the Interallied Aircraft Corporation was prohibited from selling any of its present stock of machines. Whilst reports published are true insofar as the decree is concerned, they do not state that this decree was granted by Judge Chatfield on the consent of the attorneys of the Interallied Aircraft Corporation, and that this case was not argued. I attach copy of this final decree and also a copy of an agreement which was entered into on the 25th of June between the Wright Aeronautical Corporation and the Interallied Aircraft Corporation. It will be seen from perusing these documents that the Interallied Aircraft Corporation is permitted to sell its present stock and that the users of same are protected from any possibility of patent suits.*

"*Immediately upon my being advised of the various press reports referred to, I discussed the matter with Mr. George H. Houston, President of the Wright Aeronautical Corporation, and he at once most courteously admitted that insofar as the Interallied Aircraft Corporation was concerned the reports of the decree were misleading and it was arranged that a further statement should be issued through the press amending the previous information given.*

(*Signed*) "*JOHN INWOOD,*
"*Manager, Interallied Aircraft Corporation.*"

As the Interallied did not argue the case, but entered into an agreement with the Wright Aeronautical Corporation in consideration also for certain privileges other than those involved in the sale of Avros, the transaction was simply a trade transaction, and the entire statement of the Manufacturers' Aircraft Association is legally and ethically a tissue of misrepresentations intended to mislead, and damaging the Interallied Aircraft Corporation and the Aerial Transport Corporation. It clearly violates the written and unwritten laws which govern the affairs of men.

Manufacturers' Aircraft Association's Statement Intended to "Worry" Hundreds of Dealers and Users of Aeroplanes Who Form the Backbone of the American Aeronautic Industry

The mis-statements of the Manufacturers' Aircraft Association quoted above were intended to "worry" the hundreds of dealers and users of aeroplanes who form the backbone of the American aircraft industry. These constitute a valuable asset to the country because they keep hundreds of ex-Army and Navy aviators and mechanics in training while they are doing most valuable pioneer work in testing aeroplanes for various utilitarian purposes and establishing aerial transportation lines.

If the M. A. A. were something more than a small clique of selfish individuals whose methods, as characterized by the U. S. Senate Investigating Committee, have been **"vicious and designed to reap large profits by taking advantage of the necessities of the Government;"** and if the M. A. A. had any intention of assisting the American aeronautic industry, instead of taking every opportunity to throttle it by trade restraint practice and conspiracies; if the M. A. A. had the least interest in the development of aeronautics in the United States outside of trying to get unwarranted Government subsidies for a few individuals who have already made large profits from the war; the M. A. A. would encourage, and not try to stop, the activities of the hundreds of progressive aeroplane users, aerial transportation companies and distributing agencies throughout the country.

It will be noted that the Association's statement attempted to convey the idea that a decree had been obtained on merit, which was final and national and international in its effect. It counted on the general public's ignorance of the extent of jurisdiction of United States District Courts, so as to convey the impression that the agreement made between the Interallied Aircraft Corporation and the Wright Aeronautical Corporation in connection with the suit instituted by the latter in the Eastern District of New York, U. S. District Court, would be national and international in its effect. As a matter of fact, the decision rendered by Judge Hand, U. S. District Court, Southern District of New York, quoted in the July 5th, 1920 issue of Aerial Age, gives Judge Hand's decision as being that aeroplanes manufactured for sale to or use by the British Government only, "while creating but a personal license that was non-assignable freed the product as much as a sale would do from the monopoly of the patent and enable them to sell it for use anywhere as fully as though they had purchased it from the patentee."

We reproduce herewith part of our editorial of July 5th, 1920, which gives a pen sketch of the patent situation:

Court Upholds Release of British Made "Surplus" Aeroplanes

Herewith is reproduced the opinion of District Judge, Augustus N. Hand, in the action of Curtiss Aeroplane & Motor Corporation against United Aircraft Engineering Corporation. We are informed by an attorney that the attorneys for the Curtiss Company that their appeal from the decision of Judge Hand has been heard in the Circuit Court of Appeals for this Circuit and that the decision of Judge Hand was affirmed, and further that they did not intend to appeal to the Supreme Court of the United States.

The decision follows:

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK
CURTISS AEROPLANE & MOTOR CORPORATION,
Complainant,
—against—
UNITED AIRCRAFT ENGINEERING CORPORATION,
Defendant

Augustus N. Hand, District Judge:—

This is a motion to dismiss the bill which alleges that the British Government sold to the defendant certain aeroplanes which are stated to have been "manufactured in Canada under certain agreements between plaintiff and the British Government or its duly authorized agents, of which profert is thereby made * * * ." While the bill goes on to allege that under these agreements, "Such aeroplanes were manufactured for sale to or use by the British Government only. * * * ." I have held upon a motion for a preliminary injunction that the arrangement "*while creating but a personal license that was non-assignable freed the product as much as a sale would do from the monopoly of the patent and enable them to sell it for use anywhere as fully as though they had purchased it from the patentee.*"

The bill alleges that "as an example of such infringement plaintiff alleges that defendant has sold in the Southern District of New York an aeroplane designated by defendant as Canadian Curtiss or Canadian J N-4 machine and that such aeroplane is an infringement * * * ."

The complainant agrees that by reason of the above phraseology the bill embraces more subjects of infringement than the J N-4 machines. I think, however, that this is a narrow construction of the meaning of the bill, because, in spite of the foregoing language, the allegations of subdivision X of the bill, where the infringements referred to are described, specifies only aeroplanes manufactured under the contracts "of which profert is * * * made." Counsel for complainant, at the time of the argument, did not suggest that he knew of any other infringements, and I think the fair meaning of the bill is that such infringements are limited to those mentioned in subdivision X. These I have held upon the foregoing motion are not in fact infringements because of the terms of the agreements under consideration. It seems much better to raise the whole question, which is not free from doubt by a decree dismissing the bill than to have the appeal taken merely upon an order denying a motion for a preliminary injunction, the issuance of which might be treated by the Circuit Court of Appeals as a matter of discretion with the District Court. For this practical reason, as well as because I think the bill can fairly be construed in no other way than that which I have indicated, I am of the opinion that the same should be dismissed. Inasmuch as the whole matter before the Court turns upon the construction of the written agreements between the parties which are a matter of record I see no reason for allowing the filing of an amended bill.

The bill is dismissed with costs.

A. N. H.
August 19, 1919. D. J.

Decision Helped Progress of Aeronautics in United States

This decision of Judge Hand did much to help the progress of aeronautics during the past year, as it made it possible for aviators to obtain and operate at low cost British made aeroplanes with which to do the pioneer work of demonstrating the value of aeroplanes for various commercial uses. These machines were bought at very low prices from the Canadian Government, and while they were also sold at low prices, the dealers made substantial profits and the demand for spare parts and propellers, magnetos, radiators, carburetors and accessories created by the operation of these aeroplanes helped greatly to support the firms making and selling aeroplane supplies.

THE NEWS OF THE WEEK

Caproni Plans New York-to-Paris Flight in 36 Hours

Flight by luxuriously furnished seaplanes between New York and Paris in thirty-six hours is the goal that Giami Caproni, Italy's aeronautic wizard, hopes to attain during the next year.

The project is engaging the closest study of Signor Caproni and several aeronautic engineers who are associated with him. They have been conducting a series of experiments with motors.

Signor Caproni and his associates also hope to complete soon their latest invention, a one-hundred-passenger aeroplane for overland flights.

Name U. S. Entries for International Air Race

The contest committee of the Aero Club of America has selected the following to represent the United States of America in the international aeroplane race for the Gordon Bennett Trophy, to be held in France the week of Sept. 27, 1920:

Air Service, United States Army, aeroplane to be piloted by Major R. W. Schroeder.

Aero Club of Texas, entry for S. E. J. Cox, pilot to be named, who will use a Curtiss aeroplane.

Dayton Wright Division of General Motors, pilot to be named.

Aero Limited Carried 407 Passengers in June

The first sworn statement of an aerial passenger-carrying corporation was issued recently by Aero Limited for the month of June, by C. Nicholas Reinhardt, general passenger agent, at the Waldorf-Astoria. The statement shows that 407 passengers were carried during the month, despite the fact that official statistics show there were sixteen days of rain. Each passenger was carried an average of fifty-two miles, for a total mileage of 21,164, without accident.

The statement below shows that July's business has started off at a much steadier pace and shows evidence of eclipsing that of June.

Statement of number of passengers carried from June 1, 1920, to July 6, 1920:

June 1, 106; June 2, 24; June 3, 2; June 6, 4; June 13, 48; June 21, 84; June 22, 2; June 25, 81; June 26, 34; June 27, 18; June 28, 14; July 1, 2; July 2, 51; July 5, 88; July 6, 79; total, 637.

Aero Club of Southern California Plans Air Terminal

The Aero Club of Southern California, located at Los Angeles, has completed the first quarter of the club's first year in which the organization has been perfected.

The club is planning a large air terminal and assurance has been given by the city of Los Angeles that the project will be carried out. As this may be several years off before actual completion, a request for an aircraft landing field, adjacent to the business centre of the city, and the acquisition of an emergency landing field at Exposition Park, Los Angeles, has been forwarded.

A Club committee has co-operated with the Los Angeles Board of Supervisors and County Counsel Hill in preparing an ordinance regulating flying. The ordinance provides for regulating the use of aircraft, registration and identification of aircraft, licensing aviators and machines, and to create an aircraft department of Los Angeles County, and for aircraft inspection. The ordinance, known as No. 620, went into effect July 16, 1920.

The Aero Club is assisting San Diego, Ventura, Ontario, Bakersfield, and other towns in California in establishing landing fields.

A branch of the Aero Club will be established at Venice, Cal., in a building set aside for aeronautical purposes by the Venice City Aeronautical Commission. Many routes have been mapped out by the Club and 52 landing fields west from Texas and south from San Francisco and Stockton have been listed. It is proposed to work up flying exhibitions, and to establish a State Air Patrol in California.

Seaplane Flying Popular at New Castle

New Castle By-the-Sea, N. H.—Seaplane flying over the bay is becoming a popular pastime in which many summer sojourners are indulging. One of the longest recent flights was made by Miss Marguerite Bacon, of Brooklyn.

To Unveil Monument to Wright

Paris.—The monument at Le Mans to Wilbur Wright, pioneer American aviator, will be unveiled on July 17.

The ceremony will be presided over by Premier Millerand, and Hugh C. Wallace, the American Ambassador, and representatives of the Aero Clubs of France and America will be present.

Aerial Passenger Line at Newport, R. I.

Newport.—The arrival recently by aeroplane of Gerald Hanley, of Providence, to visit Captain Hugh L. Willoughby at Newport and the announcement that a commercial aeroplane project was to be launched this summer for passenger traffic give indications that there is to be a resumption of pleasure flying which was so popular there before the war.

Wyoming Valley Aero Club Meets

The first regular meeting of the Wyoming Valley Aero Club was held recently. Various plans for getting a landing field established were discussed and steps were taken for providing the club with a plane with which exhibition work can be started in order to work up interest in adopting it for commercial uses.

The club intends to co-operate with the Kiwanis Club in order to facilitate the details of placing Wilkes-Barre upon the aerial mail route of the country.

Major Glidden Addresses Aero Club of Pittsburgh

One of the most interesting meetings ever held, attended by city officials and nationally known airmen, was that under the auspices of the Aero Club of Pittsburgh at the Fort Pitt Hotel recently.

The guest of honor was Major Charles J. Glidden, representative of the Aero Club of America, who has just returned from an eight months' trip organizing the first aerial derby around the world.

The firm conviction of Major Glidden, he told over two hundred members of the Aero Club of Pittsburgh, was that the safety of the nation depended upon a vast fleet of commercial aeroplanes. He urged the strongest co-operation among practical airmen, manufacturers and business men in building up this enterprise.

An additional boost was given the plans of the Aero Club in the recommendation of the Major that a municipal airdrome be built to encourage the service of aeroplanes for every-day use. It was pointed out that, due to inadequate landing facilities, Pittsburgh had been left off the mail route.

The charter was presented by Judge Stephen G. Stone to Capt. Mulvihill, president of the Aero Club of Pittsburgh. On behalf of the city, Mayor E. V. Babcock promised support to the club whenever its plans could be facilitated by this patronage.

Other speakers at the dinner were Hon. John S. Herron, president of City Council; Mr. Marcus Rauh, president of the Chamber of Commerce; Director of Public Safety Charles B. Prichard, all of whom promised the support of those whom they represented.

The officers of the Aero Club of Pittsburgh are: B. H. Mulvihill, president; David McClure, treasurer, and A. G. Schafer, secretary.

Major Charles J. Glidden and the reception committee that recently greeted him on his recent visit to Pittsburgh

Fly from Daytona, Fla., to Dayton, Ohio

After a successful winter season at Daytona, Fla., R. C. Marshall and Lieut. Frank Palmer, who operate a passenger-carrying, exhibition and advertising business under the name of Marshall-Palmer Air Service, have moved north to Findlay, Ohio, just outside of Dayton.

They flew all the way from Daytona to Findlay, their new location, in 22 hours 15 minutes flying time in two Curtiss Jrs.

Leaving Daytona, they followed the beach to Savannah, Ga., where they found a splendid municipal field maintained by the city. The next morning they followed the Savannah River to Augusta, where an excellent field is maintained by the Augusta Aircraft Co. The next stop was at Hopeville, and from there they proceeded to Atlanta, Ga. Leaving Atlanta, they flew to Chattanooga and landed at the Marr Airdrome. Lexington, Ky., was the next stop and Dayton, Ohio, after that.

Mr. Marshall was formerly a test pilot for the Thomas-Morse Aircraft Corporation at Ithaca, N. Y. Lieut. Palmer was a graduate of the Thomas School of Aviation and later enlisted in the Royal Flying Corps.

Open Aviation Field at Ridgewood, N. J.

A new landing field has been established at Ridgewood, New Jersey, by Mr. H. Rouclere. Seeing the future importance of the aeroplane, he purchased a new Curtiss plane, and leased the field. Regular passenger flights will be made daily, and special flights will be booked. The field will be fully equipped to handle all transient aeroplanes.

Charlotte, N. C., an Aviation Centre

The distinction of being the aviation centre of the southeast is claimed by Charlotte, North Carolina, where the Southern Aeroplane Company is located. Mr. H. R. Tucker, president of the company, has secured the southeast district agency for Farman aeroplanes. The first Farman plane was recently received, and has been making a considerable number of flights.

On the outskirts of the city a good landing field has been established with the aid of the Charlotte Chamber of Commerce. A large hangar has been constructed and a gasoline tank put on the field. The station is being fully equipped to handle all the needs of transient aeroplanes.

Much interest in aviation affairs has been displayed in Charlotte, and one day Mr. Tucker made 18 trips with the Farman, carrying a total of 41 passengers.

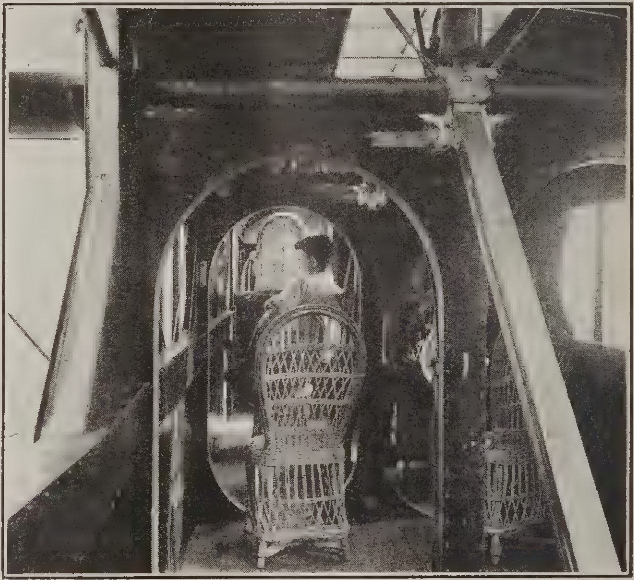
Aviators Lott and Meyers Complete Tour

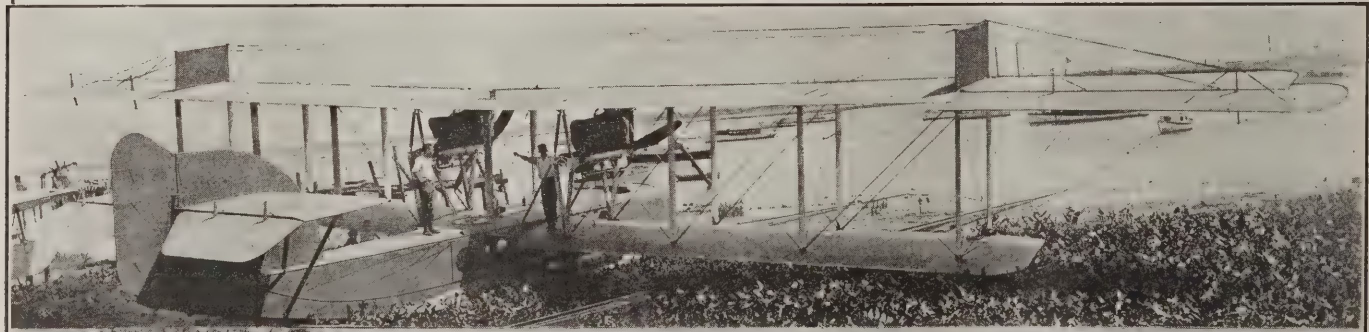
Two aviators, E. P. Lott and C. W. Meyers, recently completed an extended flying tour which took them from the Great Lakes to the Gulf of Mexico and then up to New Jersey. They used two Canadian Curtiss aeroplanes and at each stopping point along their route they carried passengers and did commercial advertising work. They covered eleven states on their trip and report much interest in aviation affairs in the south.

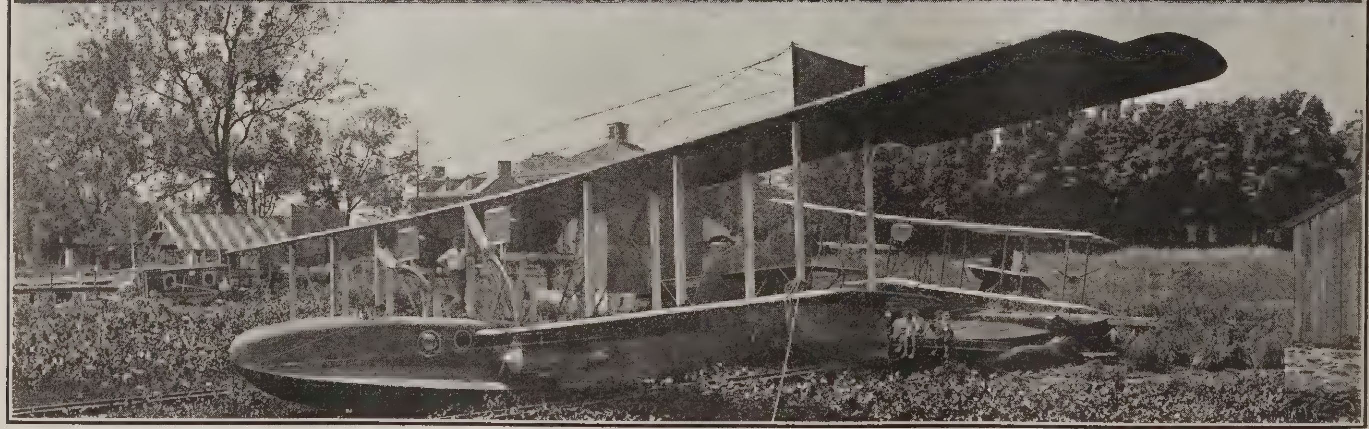
U. S. Aerial Express Passenger Cruisers

THREE views of the converted F-S-L passenger cruiser, redesigned for the U. S. Aerial Express Co. by the Board of Survey Appraisal and Sale, Navy Yard, Philadelphia. There is seating capacity for sixteen passengers and express with a total weight of 2,000 pounds. The location of the gas tanks is interesting and the large windows give the passengers an excellent range of vision. Undoubtedly the passenger service to be inaugurated by the U. S. Aerial Express between Detroit, Cleveland, Buffalo and Toronto, will rapidly become very popular.

Lieut. Thomas F. Dunn is in charge of the affairs of the company, assisted by Lieut. Arthur H. Denison and A. H. Hess.







The AIRCRAFT TRADE REVIEW

Army Contracts for Armored Triplanes

Ten armored triplanes will be built for the United States Government under a contract awarded to the Boeing Airplane Company of Seattle, construction starting at once with the first delivery scheduled in November and the other machines following rapidly before the end of the year.

These planes, representing a new type of construction, are designed to serve in aerial service for ground attack, having a function similar to that of the tanks on land. They have been characterized as "flying tanks." Quarter inch armor plate protects the fuselage and nacelles. The armament includes a thirty-seven millimeter rapid fire gun mounted in front, four machine guns trained to fire through the floor, two machine guns at the back and two above the wings.

Each triplane is to carry a crew of three or four men. The wing spread is sixty-seven feet, and the total weight approximately three and one-half tons, one ton of which is represented by the armor plate. The first model was devised and constructed at McCook Field, Ohio.

Johnston Aviation Company Operating Pittsburg Air Port

The Johnston Aviation Company is operating a landing field called the Pittsburg Air Port, located at Leetsdale, Pennsylvania. The field is 2,000 feet by 1,600 feet. It is reported that the company has several planes and is acting as an aeroplane agency.

Bellanca Plane Makes Fine Trip

An excellent flight was recently made by Pilot C. D. Chamberlain in a Bellanca aeroplane using an Anzani 45 horsepower, six-cylinder, air-cooled engine, when he flew from Mitchell Field, near Garden City, Long Island, N. Y., to Glens Falls, N. Y., 220 miles away, in 2 hours and 5 minutes.

Only eight gallons of gas was consumed during the whole trip, averaging over 27 miles per gallon, which is quite remarkable.

Flying Boats for California Tourists

The Syd. Chaplin Aircraft Corporation, Curtiss distributor for southern California, has purchased two Curtiss H-16 flying boats which will be remodeled to accommodate fourteen passengers each and utilized in tourist transportation between Los Angeles and the Catalina Islands. The boats will be flown on a daily schedule. The Chaplin Corporation will also continue to operate two Curtiss Seagulls with which the Catalina service was inaugurated last year, the first regularly scheduled aerial passenger service ever established in America.

Fairchild Aerial Camera Corporation Expands

In order to take care of the demand for aerial cameras and equipment, the Fairchild Aerial Camera Corporation found it necessary to move to larger quarters. The company is now located at 136-146 West 52nd Street, New York City, where they will have ample space to manufacture their product to meet the increasing demands.

Aero Service and Field at Salina, Kan.

The inauguration of a complete commercial aerial service covering all points in the midwest is announced by the Salina Airplane Company, of Salina, Kans. A number of Canadian Curtiss aeroplanes are available at all times for special flights, for advertising, photographic or business trips.

The company also deals in aeroplanes and equipment of all kinds for motors or planes. Parts may be obtained at short notice. A limited number of pupils are being accepted for flying instruction and aeroplane mechanics.

A fine field, belonging to the Salina company, is open to all transient pilots. It is located at the southwest corner of the crossroads southwest of the Kansas Wesleyan University at the southern end of Salina.

Banks to Use Air Service

London.—It is announced that the banks of England, France, Spain and Portugal have combined to run a private aeroplane service for the carriage of securities, bonds, etc., between the four countries.

The service is to begin in a few days, the route being London, Paris, Bordeaux, Madrid and Lisbon.

Plane Carrying Three Makes Fine Trip

In a Boeing aeroplane Pilot Herbert Munter with two passengers recently made a very successful air trip. The flight started from Kent Field, Seattle, and the first hop landed the passengers in Spokane, Wash., after successfully crossing the Cascade mountains at an altitude of more than 10,000 feet. The trip was continued on into Idaho and return to Spokane. Then the aviators went to Walla Walla, Wash.; from there to Yakima, Wash., and thence down the valley of the Columbia river to Portland, Ore., and returned to Seattle.

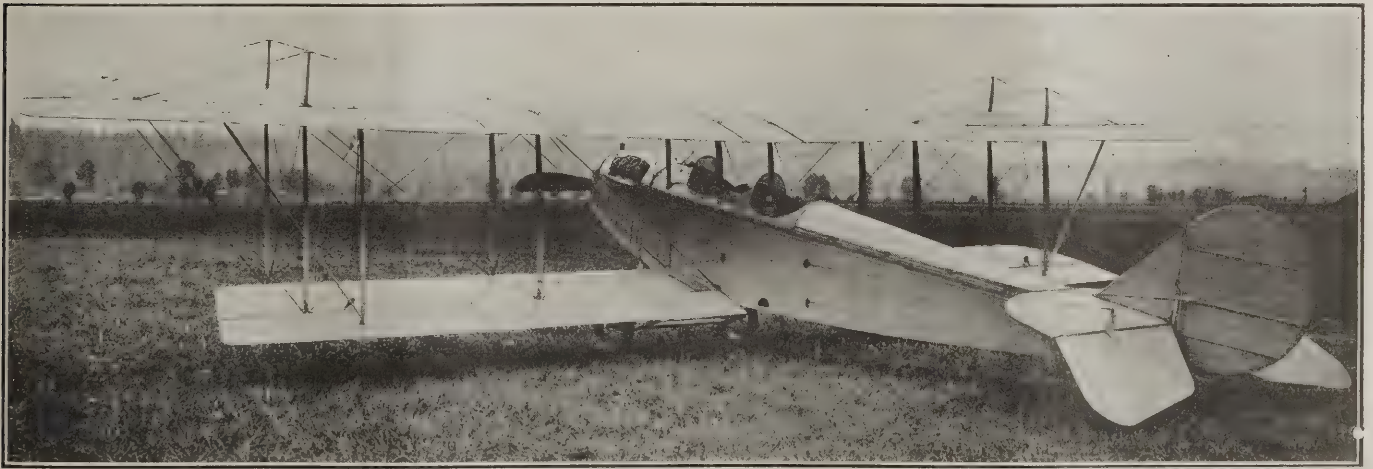
The actual flying time was five and one-third hours, in which time 480 miles was covered, making an average rate of speed of 90 miles an hour.

With its 200-horsepower Hall-Scott motor the Boeing machine attains a speed of 110 miles an hour and lands at 40 miles an hour. It is of the tractor type, having an upper wing span of 44 feet 3 inches and a length over all of 31 feet. Its gross load capacity is 2,800 pounds.

With Pilot Munter in the first long trip of this machine were F. W. Strang and Archie Munter, who obtained a large collection of valuable photographs.

This flight was made to demonstrate the feasibility of an aerial mail route over the Cascade mountains connecting Seattle and other Washington cities with the overland route between Chicago and San Francisco. An effort will be made to have the Government establish such a route where mails to and from Seattle can be transferred from the direct line at Salt Lake City.

The aeroplane in which this trip was made was built by the Boeing Airplane Company at its Seattle plant. Munter, president of the Aerial Tours Company, is using the plane this summer to carry tourists to Mount Rainier and other scenic points in the Pacific Northwest.



Boeing aeroplane in which Pilot H. Munter and two passengers flew over the Cascade Mountains in the State of Washington

POSTOFFICE DEPARTMENT ISSUES CALL FOR PROPOSALS FOR OPERATION OF AERIAL MAIL ROUTES

THE Postoffice Department has issued a call for proposals for the operation of aerial mail routes under contract to supplement the transcontinental aerial mail service between New York and San Francisco, which will be operated by the Department.

In making the specifications to be complied with by the bidders of these contract routes, the Department has been guided by its experience in the operation of the service during the past two years, and requirements are such as will admit of the employment of any modern type of aeroplane. Any modern aeroplane can easily perform the service.

The call for bids and specifications as to each of the proposed routes follow:

Postoffice Department,
Washington, July 10, 1920.

Sealed proposals will be received at the office of the Second Assistant Postmaster General until noon of September 10, 1920, for carrying the United States mails for the term of one year from November 15, 1920, or from some such subsequent date as the Department may agree to, which date should not be later than four months from the date of award, on the following described routes, by the schedules stated, or such other schedules of like running time as the Postmaster General may prescribe, in safe and suitable aeroplanes (or seaplanes).

Route No. 631001: From Cleveland, Ohio, to Detroit, Mich., and back, 306 times a year, carrying 1,000 pounds of mail a single trip each way. Air-line distance approximately 95 miles.

Schedule: Leave Cleveland daily, except Sundays and holidays, not later than 5 A. M., eastern time, or within one hour from the time of delivery of the mail to contractor at postoffice or railroad station; arrive at Detroit by 7 A. M., eastern time.

Leave Detroit daily, except Sundays and holidays, not later than 7:30 A. M., eastern time, or within one hour from the time the mail is delivered at the postoffice or railroad station to the contractor; arrive at Cleveland by 9:30 A. M., eastern time.

Bond required, $4,000.

Route No. 610001: From Pittsburgh, Pa., by Columbus, Ohio, Cincinnati, Ohio, and Indianapolis, Ind., to St. Louis, Mo.; approximately 600 miles, and back, by aeroplane; 306 times a year, carrying 1,500 pounds of mail a single trip each way.

Schedule: Leave Pittsburgh daily, except Sundays and days following holidays, not later than 9 A. M., eastern time, or within one hour from time the mail is delivered at the postoffice or railroad station to the contractor; arrive at Columbus, Ohio, by 11:10 A. M. Leave Columbus by 11:30 A. M. and arrive at Cincinnati by 11:50 A. M., central time; leave Cincinnati by 12:10 P. M. and arrive at Indianapolis by 1:30 P. M.; leave Indianapolis by 1:50 P. M. and arrive at St. Louis by 5 P. M., central time.

Leave St. Louis daily, except Mondays and days following holidays, not later than 9 A. M., central time, or within one hour from time the mail is delivered to the contractor at the postoffice or railroad station; arrive at Indianapolis by 12:10 P. M. Leave Indianapolis 12:30 P. M. Arrive Cincinnati by 1:50 P. M. Leave Cincinnati 2:10 P. M. Arrive Columbus by 4:30 P. M., eastern time. Leave Columbus 4:50 P. M. Arrive Pittsburgh by 7 P. M., eastern time.

Bond required, $25,000.

Route No. 607002: From New York, N. Y., by Harrisburg, Pa., Pittsburgh, Pa., and Fort Wayne, Ind., to Chicago, Ill., approximately 735 miles, and back, by aeroplane, 306 times a year, carrying 1,500 pounds of mail on a single trip each way.

Schedule: Leave New York daily, except Mondays and days following holidays, not later than 6 A. M., eastern time, or within one hour from the time the mail is delivered to the contractor at the postoffice or railroad station; arrive at Harrisburg by 8 A. M. Leave Harrisburg 8:20 A. M.; arrive Pittsburgh by 10:30 A. M. Leave Pittsburgh 10:50 A. M.; arrive Fort Wayne 1:30 P. M., central time. Leave Fort Wayne 1:50 P. M.; arrive Chicago by 3:50 P. M., central time.

Leave Chicago daily, except Mondays and days following holidays, not later than 6 A. M., central time, or within one hour from time the mail is delivered to contractor at postoffice or railroad station; arrive Fort Wayne by 8 A. M. Leave Fort Wayne 8:20 A. M.; arrive Pittsburgh by 1 P. M., eastern time. Leave Pittsburgh 1:20 P. M.; arrive Harrisburg by 3:30 P. M. Leave Harrisburg 3:50 P. M.; arrive New York by 5:50 P. M., eastern time.

Bond required, $23,800.

Route No. 607003: From New York, N. Y., by Washington, D. C., Raleigh, N. C., and Columbia, S. C., to Atlanta, Ga.; approximately 815 miles, and back, 306 times a year, carrying 1,500 pounds of mail on a single trip each way.

Schedule: Leave New York daily, except Mondays and days following holidays, not later than 7 A. M., eastern time, or within one hour after the mail has been delivered to the contractor at the postoffice or railroad station; arrive Washington by 9:40 A. M. Leave Washington 10 A. M.; arrive Raleigh by 1:10 P. M. Leave Raleigh 1:30 P. M.; arrive Columbia by 3:55 P. M. Leave Columbia 4:15 P. M.; arrive Atlanta by 6:55 P. M.

Leave Atlanta daily, except Mondays and days following holidays, not later than 5:30 A. M., eastern time, or within one hour from time the mail has been delivered to contractor at the postoffice or railroad station; arrive Columbia by 8:10 A. M. Leave Columbia 8:30 A. M.; arrive Raleigh by 10:55 A. M. Leave Raleigh 11:15 A. M.; arrive Washington by 2:25 P. M. Leave Washington 2:45 P. M.; arrive New York by 5:25 P. M., eastern time.

Bond required, $30,000.

Bids to state rate per annum.

Decision as to award of contract will be made as soon as practicable after September 10, 1920, and the accepted bidder shall execute the formal contract prescribed by the Department covering the service advertised, with good and sufficient sureties acceptable to the Postmaster General, and file such contract within thirty days from date of the acceptance of the proposal. The Postmaster General reserves the right to reject all bids.

The law provides: "That the Postmaster General may contract with any individual, firm or corporation for an aeroplane mail service between such points as he may deem advisable and designate, in case such service is furnished at a cost not greater than the cost of the same service by rail, and shall pay therefor out of the appropriation for inland transportation by railroad routes." Bidders are advised that the saving in rail transportation on the routes herein advertised will not exceed the following amounts:

Route No. 631001, Cleveland-Detroit, $40,000.

Route No. 610001, Pittsburgh-St. Louis, $200,000.

Route No. 607002, New York-Chicago, $238,000.

Route No. 607003, New York-Atlanta, $300,000.

Bidders should state the number of planes it is proposed to provide for carrying the mails on the route (including the number in reserve for each plane in the air daily); description of planes, showing number of motors, horsepower, speed, cruising radius.

Bidders and their sureties are urged to acquaint themselves fully with the laws of Congress relating to contracts for carrying the mails (the more important provisions of which are cited herein) and to familiarize themselves with the requirements set forth in this advertisement and with the service to be performed before they assume any liability as bidders or sureties, so as to prevent misapprehension or cause of complaint thereafter.

Bidders will be required to furnish bond with two or more individual sureties approved by a postmaster of the first, second or third class, and be acceptable to the Postmaster General, such sureties to be shown to be owners of real estate valued above all incumbrances at an amount double the amount of the bond required, or a surety company which has complied with the provisions of the Acts approved August 13, 1894, and March 23, 1910. A list of such surety companies may be found on page 61 of the Official Postal Guide for July, 1919, a copy of which is furnished each postmaster.

If the accepted bidder fails to file a properly executed formal contract for the service in the Department within thirty days from the date of acceptance of the bid, or, having executed the contract, fails to provide the service required, he may be declared a failing bidder or contractor and proceedings taken according to law.

Mail compartments in all planes to be made fireproof to the satisfaction of the Postoffice Department.

Contractors will be required to take the mail and every part thereof from, and deliver it and every part thereof into, each intermediate postoffice stated on the route, and from and into the postoffice at each end of the route. Mail must leave the flying field for the postoffice within five minutes of arrival of the plane, and mail must not be in transit between the flying field and the postoffice longer than thirty minutes except by express agreement with the Department.

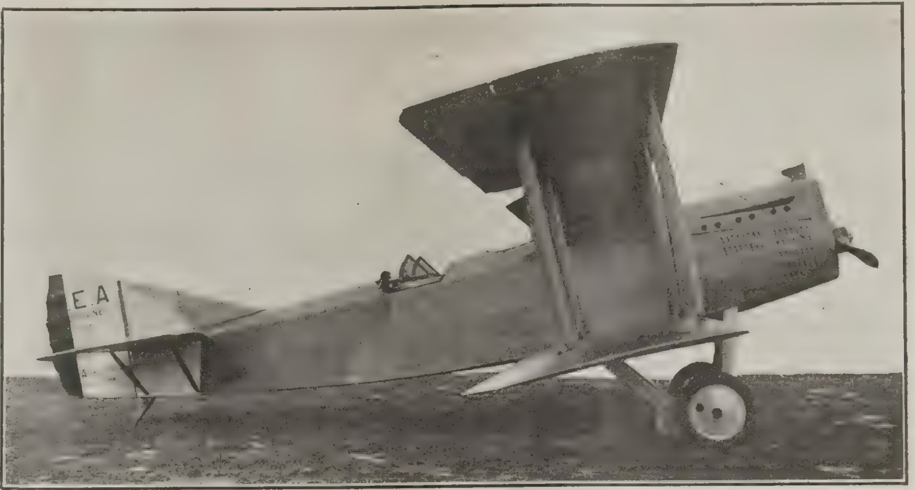
The intermediate postoffices stated are to be supplied each way on all trips.

The contract for the service shall contain the following covenant:

The contractor expressly warrants that he has employed no third person to solicit or obtain this contract in his behalf, or to cause or to procure the same to be obtained upon compensation in any way contingent, in whole or in part, upon such

(*Continued on page* 648)

THE HENRI POTEZ AEROPLANES



Henry Potez, Type S. E. A.-IV.-C.2, military aeroplane for combat or observation work

OF the many foreign builders of aircraft, much attention has been drawn to the activities of Henry Potez, aeroplane constructor of Aubervilliers, France. The Potez aviation factory made its first appearance during the war by the construction of a series of different machines and was soon considered as one of the most important French aviation firms by the use of new machines which were brought out.

The Henry Potez aeroplanes charactize themself in a general way, by the study of safety which is produced at a maximum for the use to which each machine is designed.

The various types which are being made are of great interest, and are classed as follows:

1. Type S. E. A. IV-C. 2—Military two-seater biplane for combat or long distance reconnaissance. This machine is the latest type designed for the French military aviation as a two-seater fighter and long distance observation plane. Although a two-seater and carrying a large military load, its performance is better than that of most single-seater planes. A number are being used by the French army to much satisfaction, and more are to be obtained. This type is powered by a Lorraine-Dietrich Type 12-D, 400 H.P. engine.

Specifications:

Wing Span—39 ft. 4 in.
Length—27 ft. 6 in.
Total Area of Surface—409 sq. ft.
Height—9 ft. 9 in.
Weight, empty—2237 lbs.
Useful Load—1290 lbs.
Total Weight, loaded—3527 lbs.
Load per sq. ft.—8.6 lbs.
Weight, per H.P.—8.18 lbs.

Performance:

Speed Near Ground—135 miles per hour.
Speed at 6,500 ft.—130 miles per hour.
Speed at 13,000 ft.—125 miles per hour.
Climb, 6,500 ft.—6 minutes 12 seconds.
Climb, 16,400 ft.—21 minutes, 50 seconds.
Ceiling—24,600 ft.
Radius of flight—over 435 miles.

2. Type S. E. A. IV-P. M. This is almost the same as the type just described, except for changes in the fuselage. The military equipment has been removed and the machine is designed for long distance flights, by the addition of fuel tanks enabling the plane to remain in the air for 5½ hours, with a flight radius of over 750 miles. It has the same engine as the military machine and possesses the same speed. It is excellent for mail and express transport service.

3. Type S. E. A. VII. This aeroplane is designed for aerial touring and transport service. It is similar to the preceding types with the same engine and has the same general lines. The fuselage contains an enclosed cabin, seating two or three persons very comfortably. The wing area is slightly larger to permit slower landings. The speed is about 124 miles an hour.

Specifications:

Surface area—474 sq. ft.
Wing Span—46 ft.
Length—30 ft.
Weight, empty—2425 lbs.
Useful Load—1212 lbs.
Weight, loaded—3637 lbs.

4. Type VIII. This is the little bi-plane which has been making a name for itself in France. It is a sport type aeroplane, equiped with the Potez 4-cylinder air-cooled engine of 50 horsepower. This aeroplane is all metal, the fuselage consisting of sections of duraluminum, secured to the longerons similar to the construction of a ship. It makes a very substantial and rigid construction, and of course will not deteriorate. All the surfaces and frame works are of duraluminum.

The longerons are of U-shape forming the outline of the body. The fittings are of sheet steel.

The landing gear has been designed for greatest factor of safety. The chassis has four wheels to prevent turning over, and is constructed very strongly.

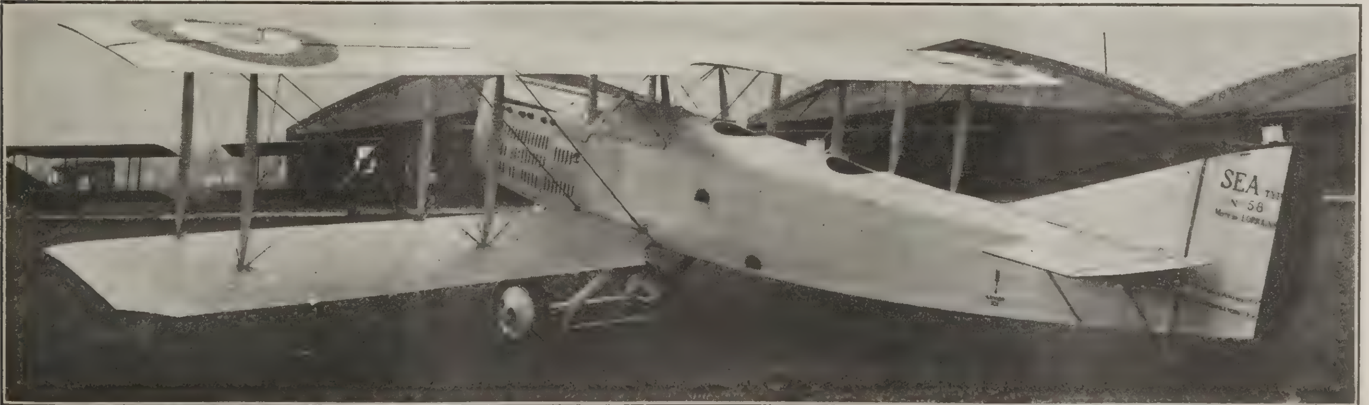
A special unique arrangement of the engine, which is located vertically at the front of the fuselage, necessitates a gear transmission to the propeller shaft. A brake, operated by the pilot, permits a quick stop of the machine from rolling after landing. This machine lands at 25 miles per hour and recently a landing was made at Bourget aerodrome, France, in which the plane came to a full stop in 33 feet.

This machine carries two persons, the passenger seat being at the centre of gravity so that the machine may be flown as a single seater without disturbing its balance. It is equipped with dual controls.

Specifications:

Span, upper wing—26 ft.
Span, lower wing—21 ft.
Length, total—18 ft.
Area of Wings—204.7 sq. ft.
Weight, empty—485 lbs.
Useful load—440 lbs.
Weight, loaded—925 lbs.
Weight per sq. ft.—4.5 lbs.

This aeroplane may be used, similarly to an automobile. It is extremely economical



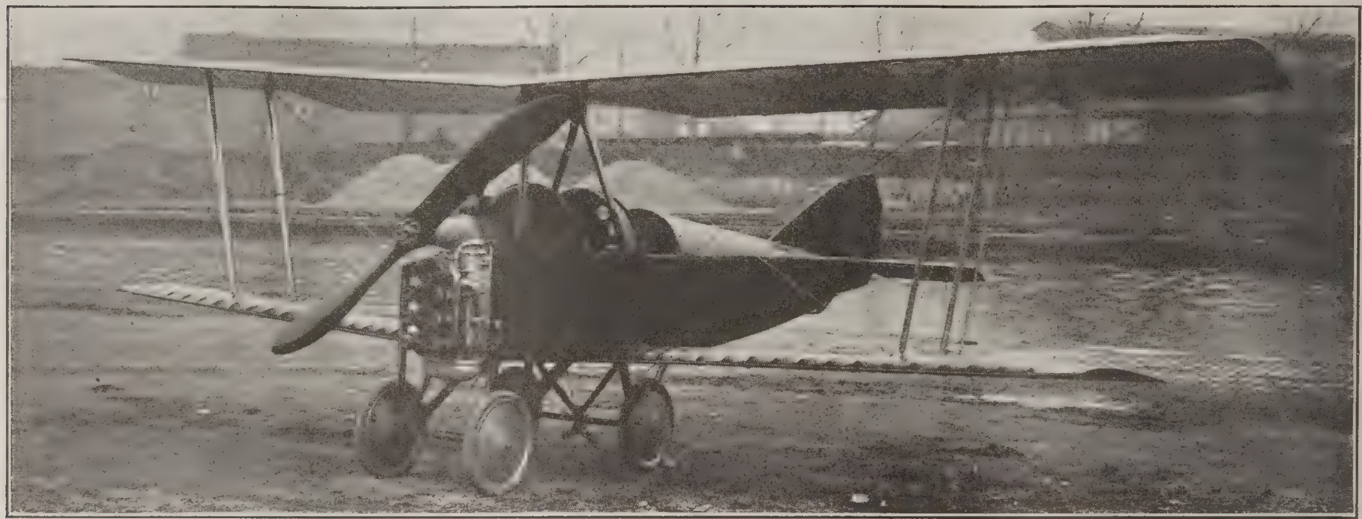
Potez, Type S. E. A. IV.-P. M., long distance transport plane, equipped with a Lorraine-Dietrich 400 H.P. engine and will last a long time. Its construction permits use under all climatic conditions."

The Henry Potez Type A 4 motor, used in this aeroplane is of very strong qualities. It is the first of its kind, being constructed similar to an automobile engine. It is a 4-cylinder type, air cooled, and gives 50 horsepower. It requires less fuel for operation than other aviation engines. By its unusual location a uniform cooling is given each cylinder. The crank case is vertical, the propeller shaft connecting at the top end with the crank shaft by gears. The weight of the engine is 220 lbs.

R. P. M. of engine, normal, 2,200.

R. P. M. of propeller, 1,100.

Fuel consummations, 3.9 gals. per hour.



Potez, Type VIII, all metal sport type aeroplane, with Potez, Type A4, engine of 50 H.P. This machine is made of duraluminum throughout

HAMMONDSPORT AGAIN AERONAUTIC CENTER

HAMMONDSPORT has always been connected with aircraft. At the mention of the name one recalls the pioneer work of Glenn Curtiss which was carried on there and the rapid development from the experimental stage to the intensive war production, which reached its height during the great war when Hammondsport grew in size and popularity in the aviation game.

It was here that many of the men who have since become the most prominent figures in army and navy aviation received their training, and Hammondsport points with pride to such men as Messrs. Towers, Witmer, Bellinger, Callan, Richardson, Carberry, Havens, Doherty, McCullough and others.

Recently the natives have noticed some of the old-timers in town and immediately rumors spread about of renewed activity in aircraft here. The rumors were correct, as later developments have shown. Two new concerns have located here.

They are the Aerial Service Corporation and the Airship Manufacturing Company of America.

The Aerial Service Corporation was conceived and organized by four of the old Curtiss boys. The officers are Henry Kleckler, president; William C. Chadeayne, vice-president, and Alden K. Ainlay, secretary and treasurer.

Mr. Kleckler was assistant to Mr. Curtiss in the old experimental days and later was chief engineer for the Curtiss Aeroplane & Motor Corporation.

Mr. Chadeayne was associated with the Curtiss Corporation for five years as wood production manager, engineer and maintenance manager.

Mr. Ainlay was connected with the Exhibition Company for a number of years, and recently was sales manager at the Buffalo plant of the Curtiss Corporation.

The fourth member of the concern is Mr. Charles C. Witmer, who was Russian representative for the Curtiss organization for several years.

The corporation has taken over one of the Curtiss woodworking shops, which they have enlarged in order to take care of the large amount of business already on hand. A large tract of land adjoining has been acquired and is being prepared for the erection of additional buildings.

An L-shaped flying field, situated on the State Highway about one mile outside of the village, has been laid out. This field adjoins the famous Rheims Track, where most of Mr. Curtiss's first experiments were carried out. Regulation Government markers have been adopted, and the field is easily discerned from the air due to it being located so prominently at the head of Lake Keuka, the one lake among the Finger Lakes chain that has two forks and lies so deep in the valleys. It is expected that this field will be the landing place for all trans-continental flyers and also an emergency stop-over for army pilots. All visitors from the air will be welcomed.

(*Continued on page* 659)

Aeroplane and Dirigible Landing Field at Hammondsport, N. Y. This is the field from which Glenn H. Curtiss made the first flight in the "June Bug"

METHOD OF NAVIGATING AIRCRAFT

An important patent relating to methods of navigating aircraft has recently been issued to Joseph A. Steinmetz of Philadelphia, who is president of the Aero Club of Pennsylvania.

The invention provides a method of navigating aircraft, by the use of marking signals, in the form of smoke bombs or luminous flare lights for night travel, which are projected from the aircraft, preferably by means of a gun, toward the ground or surface of the sea, at a given angle in relation to the horizontal line of flight in advance of the aircraft. Means for timing the interval between the instant of firing the gun and the instant of the striking of the projectile are given, and from this time the distance is calculated from a chart prepared for the purpose and which ascertains the altitude of the aircraft at time of firing the projectile at a given angle.

FIG. 1.

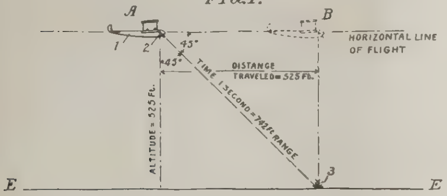
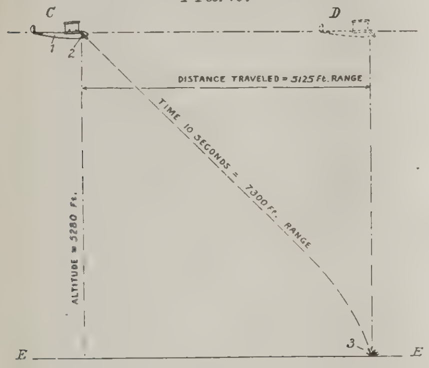

A
B
1
2
45°
45°
HORIZONTAL LINE OF FLIGHT
DISTANCE TRAVELED = 525 Ft.
TIME 1 SECOND = 742 Ft. RANGE
ALTITUDE = 525 Ft.
3
E
E

FIG. 2.


C
D
1
2
DISTANCE TRAVELED = 5125 Ft. RANGE
TIME 10 SECONDS = 7300 Ft. RANGE
ALTITUDE = 5280 Ft.
3
E
E

Referring to the drawings:

Fig. 1, is a view in elevation of an aircraft and representing diagrammatically the vertical plane between the horizontal line of flight and the surface of the ground or sea:

Fig. 2, is a view similar to Fig. 1, showing the aircraft traveling at a greater height;

Fig. 3, is a view similar to Fig. 1, showing how two or more bombs or marking signals may be placed in a straight line from which the amount of leeway or side drift of the aircraft may be ascertained;

Fig. 4, is a plain view of Fig. 3.

Fig. 5, is a face view of the table or chart showing the range, altitude and distance traveled corresponding to the length of time in seconds for various trajectories of the projectile or marking signal.

Throughout the drawings similar reference characters refer to like parts. These distances specified are to be considered for purposes of illustration, as they are only approximately correct. A standard may be established from actual tests by firing the gun from a known height over a measured course and the result of such tests are to be embodied in the chart or form a basis for the calculations.

Referring to Fig. 1, of the drawings the aircraft 1 is assumed to be traveling over an area without any known object in view and it is desired to ascertain the speed at which the aircraft is traveling and also its altitude; the aircraft is brought to a horizontal line of flight, which may be readily done by the assistance of the clinometer. A gun, 2 is mounted upon the aircraft in such a manner that it may be aimed at any desired angle in relation to the horizontal line and in a vertical plane parallel with the line of flight. If the gun, 2 be aimed at an angle of forty-five degrees below the horizontal line and in the direction of the line of flight, a projectile, 3 of known ballistics, fired from the gun and the time of flight of the projectile ascertained by the aid of a split second stop watch, the range, or trajectory of the projectile may be calculated, or ascertained from the chart shown in Fig. 5.

In addition to the above mentioned record of the elapsed time between the firing of the gun and the striking of the marking signal, 3 upon the line E—E, representing the surface of the ground or sea, a second record is made of the time between the firing of the gun and the moment the aircraft is directly over the projectile, or marking signal 3, on the surface of the ground or sea.

The air navigator now refers to the chart for the forty-five degree angle, which is the angle at which the gun was fired. If the elapsed time from the firing of the gun until the marking signal 3 reached the end of its flight was one second, in the first column of the chart will be found tabulated one second under the heading "Time." On the same line of the chart under heading "Altitude" in column three will be found five hundred and twenty-five feet, which will be the altitude of the aircraft when one second of time was required for the flight of the marking signal. In the fourth column under "Distance traveled" will be found five hundred and twenty-five feet, which will be the distance traveled by the aircraft from position A, Fig. 1, where the aircraft was when the marking signal was fired from the gun to position B directly over the marking signal on the surface of the ground or sea. By referring to his record the navigator finds that the elapsed time for this distance A to B, Fig. 1, was six seconds, and knowing the distance to be five hundred and twenty-five feet, he can readily calculate that he is traveling at the rate of nearly sixty miles per hour.

If the gun was fired when the aircraft is in position C, Fig. 2, and the time required for the marking signal 3 to reach the surface of the ground or sea was ten seconds, by referring to the chart, it will be found that opposite to "Ten seconds" will be given the altitude, fifty-two hundred and eighty feet, and the distance traveled to be fifty-one hundred and twenty-five feet. Knowing that the time consumed in traveling fifty-one hundred and twenty-five feet, or from position C to position D, Fig. 2, to be, say fifty-eight and one-fifth seconds, he will know that he is maintaining a speed of sixty miles per hour. Should the time for the distance be greater than that above mentioned, as for instance two and one-half minutes, then the rate of speed will only be about twenty-three miles per hour. A relatively shorter time for the distance will show a greater speed per hour.

By referring to Fig. 1 it will be seen that a right triangle A—B—3 is formed by the firing of the gun at an angle of forty-five degrees. The trajectory forms the hypotenuse of the triangle and if its length be known and the angle A is forty-five degrees, the length of the two other sides of the triangle may be found geometrically. When the gun is fired at other than a forty-five degree angle with the horizontal line of flight, the sine of the angle will give the altitude and the cosine will give the distance traveled. By having a chart for each angle at which the gun is to be fired in relation to the horizontal line of flight, the desired results may be tabulated so that they can be quickly ascertained.

Referring to Figs. 3 and 4 it will be seen that the desired course of travel may be maintained regardless of unfavorable wind conditions. When the aircraft is in the position F, a plurality of marking signals 6—7 and 8 are fired in rapid succession at different angles in advance of the aircraft and parallel with the line of flight W—W, Fig. 4. The said marking signals 6—7 and 8 may be seen on the surface of the ground or sea, represented by the line E—T, Fig. 3. If the aircraft is blown to one side of the line of marking signals, into position G, shown in the plan view, Fig. 4, the navigator will know that he is drifting out of his desired course W—W.

If the desired course is in an eastwardly direction and the aircraft is leading

FIG. 3.

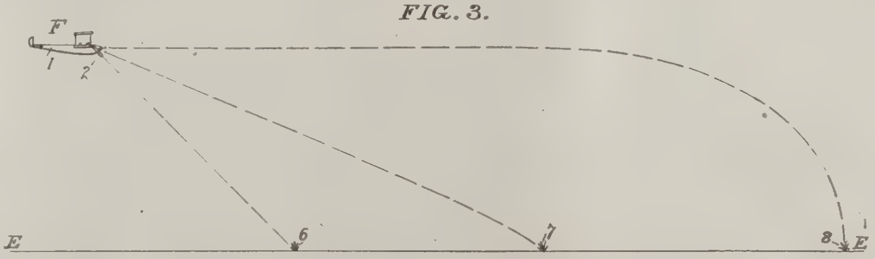
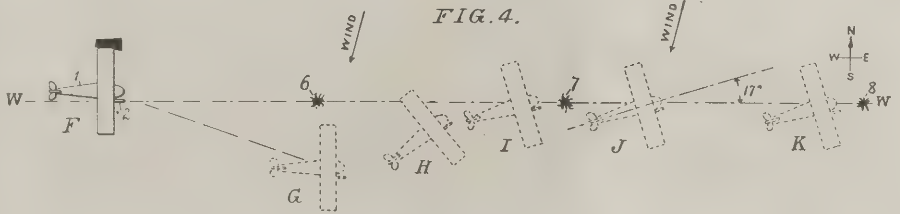


FIG. 4.



east when the gun fires the marking signals 6—7 and 8, the line W—W extending through said marking signals will indicate the desired course. When the aviator finds that he has drifted into position G, without changing his course in relation to his compass, he can at once correct his course by steering over the line formed by the said marking signals and when he has reached the position J, Fig. 4, he will know that it is necessary to head the aircraft a certain number of degrees, as shown by the compass, toward the wind to maintain his line of travel in an eastwardly direction.

In Fig. 4 the aircraft when in position J is shown heading seventeen degrees north of east and is moving in the line of the marking signals into position K. This deviation being found necessary to maintain an eastwardly course, due to the side wind pressure. By repeated corrections of the course at frequent intervals in this manner, or when the wind conditions change, a correct course may be maintained. Instead of forming the line of marking signals by projecting two or more marking signals in rapid succession as shown in Fig. 3 and 4, one marking signal may be fired in advance of the aircraft and when the latter is directly over the position of the marking signal, another marking signal may be fired still farther in advance and in the same direction, as shown by the compass and in this way a series of marking signals may be formed and utilized for regulating the course of the aircraft. The gun used upon the aircraft for firing the bombs or marking signals may be of any desired type and the bombs of such character that they will give off smoke which can be seen in day time and a flare which can be seen at night.

FIG. 5.

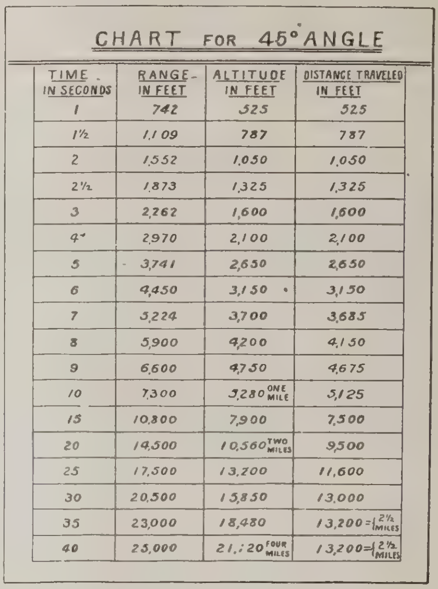


CHART FOR 45° ANGLE

TIME IN SECONDS	RANGE-IN FEET	ALTITUDE IN FEET	DISTANCE TRAVELED IN FEET
1	742	525	525
1½	1,109	787	787
2	1,552	1,050	1,050
2½	1,873	1,325	1,325
3	2,262	1,600	1,600
4	2,970	2,100	2,100
5	3,741	2,650	2,650
6	4,450	3,150	3,150
7	5,224	3,700	3,685
8	5,900	4,200	4,150
9	6,600	4,750	4,675
10	7,300	5,280 ONE MILE	5,125
15	10,800	7,900	7,500
20	14,500	10,560 TWO MILES	9,500
25	17,500	13,200	11,600
30	20,500	15,850	13,000
35	23,000	18,480	13,200 = 2½ MILES
40	25,000	21,120 FOUR MILES	13,200 = 2½ MILES

By shooting the projectiles or marking signals from a gun they will travel with great rapidity and force and therefore will not be affected by the wind to any material extent.

It will be understood that under unfavorable wind conditions it will be necessary to make repeated applications of the method to correct the course of travel in a given direction, due to the fact that the line W—W, Fig. 4, formed by the signals fired from the aircraft will only form an approximately straight line if at the moment of projection of the signals there are two forces acting thereon; the first being due to the velocity of the aircraft in the direction of drift, and the second being the projecting force which impels the signal in the direction of the course of the aircraft in which case the signals will lie in a line representing the resultant of the two forces and not in a perfectly straight line representing the direction of the projection from the gun.

These conditions have all been previously investigated and that in a moderate side wind the motion or force caused by side drift is negligible in the very short interval of time required to fire the signals and that the resultant of the forces will not be of any great consequence, and that in a heavy cross wind the pilot always heads the aircraft into the wind to reduce the side drift when he desires to travel in a given direction under an unfavorable wind. If the first set of signals projected do not fall in a straight line, they will help the pilot to correct his course and bring the aircraft into a position from which may be fired a second set of signals which will fall in an approximately straight line.

(*Continued from page* 644)

procurement; and that he has not paid, or promised, or agreed to pay to any third person, on consideration of such procurement, or in compensation for services in connection therewith, any brokerage, commission, or percentage; and that all money payable to him hereunder is free from obligation to any other person for services rendered, or supposed to have been rendered, in the procurement of this contract. He further agrees that any breach of this warranty shall constitute adequate cause for the annulment of this contract by the United States, and that the United States may retain to its own use from any sums due or to become due thereunder an amount equal to any brokerage, commission or percentage so paid, or agreed to be paid.

PENALTIES FOR FAILURE TO PERFORM SERVICE PROPERLY

No compensation will be allowed for trips not performed. For each such failure in a month over 15 per cent of the scheduled trips for the month, twice the pay for the non-performed trip may be deducted. However, pro rata pay will be allowed for the air-line distance between stated stations on a route traversed in a partially completed trip, provided that the mail reaches the postoffice or postoffices for which it is destined not later than it would have arrived had it remained on the train. For each trip, in excess of 10 per cent of the scheduled trips in a month, on which the mail is delayed beyond the time it would have arrived had it remained on the train, twice the pro rata pay of the uncompleted portion of the trip may be deducted. For repeated delinquencies, enlarged penalties proportioned to the nature of the delinquency and the importance of the mail, may be made.

The carrier will be expected to arrive within scheduled time, and deductions may be made from the contractor's pay for failure to arrive and deliver the mail in time for scheduled carrier deliveries; or for failure to arrive in time to connect scheduled mail trains in accordance with the advertised schedule, when such failures are due to late departures from landing fields for other reasons than late delivery of mail to contractor or to lack of diligence in resuming the trip after a forced landing between regularly established landing fields. Deductions will also be made for suffering the mails to become wet, injured or destroyed; or when a grade of service is rendered inferior to that stipulated in the contract; and for the loss of or depredation upon the mails in the custody of the contractor or his agent, provided the loss is occasioned by their fault.

The Postmaster General may annul the contract or impose forfeitures, in his discretion, for repeated failures or for failure to perform service according to contract; for violating the Postal Laws and Regulations; for disobeying the instructions of the Post Office Department; for subletting service without the consent of the Postmaster General, or assigning or transferring the contract; for combining to prevent others from bidding for the performance of postal service, and such annulment shall not impair the right of the department to claim damages from the contractor and his sureties.

The Postmaster General may order an increase of service in distance or in weight of mail to be transported with the consent of the contractor, by allowing therefor not to exceed a pro rata increase on the contract pay for the mileage or weight involved, provided that such pro rata cost does not exceed the cost of carrying the mails by train.

The contractor shall have the option of continuing service beyond the express terms of the contract for an additional year, such option to be exercised by the giving to the Department thirty days before the expiration of the express term written notice of intention to continue.

The contract shall be subject to action by Congress in making appropriation from year to year or authorizing continuance of the service.

SUBCONTRACTS

Assignments of contracts or of interest in contracts are forbidden by law, and consequently cannot be allowed. Neither can bids nor interest in bids be transferred or assigned to other parties. Bidders will therefore take notice that they will be expected to provide the service awarded to them through the whole contract term.

Contractors under this advertisement may be permitted to sublet service to acceptable persons, by permission of the Postmaster General, at not less than the contract rate of pay.

PREPARATION OF BIDS

Forms of proposal may be obtained on application to the Second Assistant Postmaster General or to the postmasters at points on the proposed route. Bidders are requested to use the form furnished by the Department.

When a bid is signed by an incorporated company, it should be accompanied with evidence of the authority of the person signing the bid so to sign on behalf of the company. Such evidence may be a certified copy of the proceedings pursuant to which the person was elected or appointed an officer or agent of the company and of that part of the by-laws showing his authority as such officer or agent to sign the bid; or a certified copy of a resolution of the board of directors or stockholders conferring such authority upon him.

Bids should be for service as stated in the advertisement.

PRELIMINARY REPORT ON FREE FLIGHT TESTS

BY EDWARD P. WARNER AND F. H. NORTON

(Report No. 70, National Advisory Committee for Aeronautics)

(*Continued from page* 581)

The mean lift curves for No. 1 and No. 2 are brought together in Fig. 16. The difference between the two is unfortunately not so small as that between the curves for the various tests on a single machine, and the reason for the discrepancy is not apparent. The difference between the two machines certainly is not great enough to account for it, although the reserve tank in the upper wing of No. 1 might affect the lift by a small amount. However, even if the difference between the two lift curves be regarded as wholly due to error in the experiments, the two are nearly enough alike to indicate the general form of the curve and to permit of interesting deductions.

The most important result that can be drawn from such work as this relates to the comparison between free-flight and wind-tunnel results. It has not been possible as yet to have an accurate model of the JN4H made up for wind-tunnel test, but a great deal of work has been done on the JN2[1], and this can be used as a basis of comparison. The JN2 has an Eiffel 36 wing-section, like the JN4H, but it differs from the latter in that its wings are of equal span and in a number of other details. The JN2 has a larger down load on the tail than has the 4H, as will be shown in connection with the discussion of balance, and the actual lift of the wings must therefore be greater. It would then be expected, other things being equal, that the lift coefficients here computed, which ignore the tail load entirely, would be a little smaller for the 2 than for the 4H, but the difference would hardly exceed 3 per cent.

The lift coefficient for the JN2 model and the mean coefficient for the two full-sized machines are given in Fig. 17. The coefficients for the model, like those for the full-sized machine, are based on the lift of the whole aeroplane and not on that of the wings alone. The two curves run fairly close together up to 6°, although the lift of the model is distinctly the larger, even when allowance is made for the effect of the difference in tail load just mentioned. The model lift coefficient at angles below 6° is larger than that given by the free-flight tests for either No. 1 or No. 2. At angles in excess of 6° the model lift coefficient begins to drop off rapidly by comparison with the free-flight values. The burble point for the former comes at an angle nearly 4° smaller than that for the latter, and its maximum lift is about 15 per cent less, so that the minimum speed, or, as it is usually called, landing speed, computed from the model test, would be three miles an hour higher than that found by experiment. Actually, however, the model test gives the practicable landing speed more closely than does the free-flight test, for the customary angle of attack in a good landing is about 12°, an angle at which the lift coefficient is almost exactly equal to the maximum lift coefficient of the model. In order to land the machines which were the subject of these tests at the lowest speed at which they can be flown, the tail skid would have to touch the ground while the wheels were still 16 inches above its surface (assuming the downward slope of the flight path at the instant of making contact to be 2°). As every pilot will recognize, a landing in such an attitude would be distinctly unusual, to say the least. As has already been pointed out, it requires exceptional skill to fly at angles of 15° or more, and it would not be safe for any pilot to attempt it near the ground. It is, therefore, evident that the burble point is of very little practical interest in aeroplane design, as it is improbable that any pilot ever flies his machine at that angle voluntarily except for a very brief interval in the course of a stunt or when testing for minimum speed. Whether or not the rule hinted at above, that the lift coefficient at the largest angle practicable for steady and safe flight is approximately equal to the maximum lift coefficient of the model is justified for general use can only be determined by tests, similar to those described in this report, on many different machines using wing sections of different forms. The methods now used seem to give a good approximation to the landing speed, at least in this case, but it should be distinctly understood in applying them that the machine when landing is not flying at or very near to its critical angle. In view of this fact, it is probable that the menace of an "unstable lift curve" which breaks sharply after passing the burble point, has been exaggerated, as the unstable portion of the curve is unlikely ever to be reached in normal flight, judging from the indications of these tests as to the changed position of the burble point and the behavior of the aeroplane in that neighborhood.

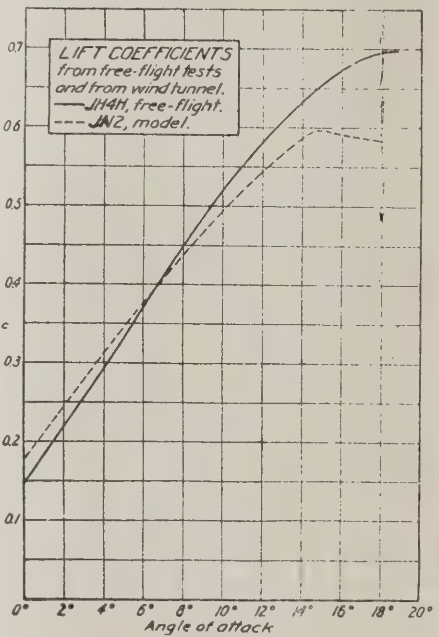


FIGURE 17.

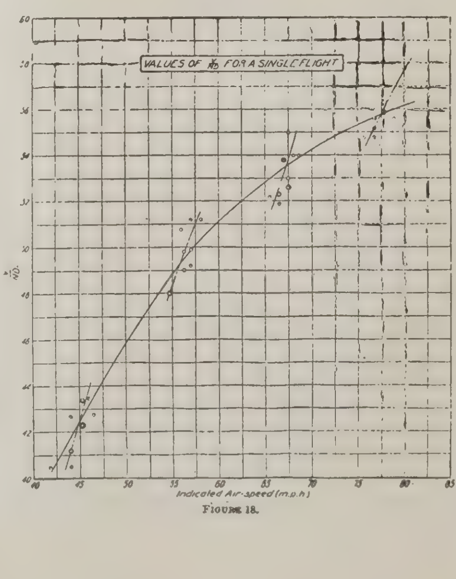


FIGURE 18.

One of the tests for lift coefficient on No. 2 incidentally gave some interesting data on the magnitude of vertical air currents. Some of the runs during this flight were made over the water (Hampton Roads) at a maximum distance of about a mile from the land and others, at nearly the same speeds, over the land. When the results were worked up it was found that the runs over the water and those over the land gave two distinct sets of curves, and that the angle of attack for a speed of 78 miles per hour was greater by 1° on the first set than on the second. This leads to the conclusion that the air was descending over the water or ascending over the land or both, and that the vertical velocity of the air in one place relative to that in the other was 120 feet per minute. This is undoubtedly an exceptional condition, as subsequent tests, although they frequently showed a difference in angle with the kind of country over which the machine was passing, indicated no other vertical velocities as large as that just mentioned. It should be noted that the flight just described took place in the morning, on a sunny day, and that all the observations were taken at a height of 2,700 feet. Since the results obtained on the runs over the land checked well with the other tests on the same machine it is probable that the vertical velocity there was not very large, and that most of the relative movement deduced was due to a downward motion of air over the bay, or at least over that portion of it covered by the flight.

A much disputed question relates to the effect of the slip-stream on the lift of an aeroplane. Although no attempt at quantitative measurements in inclined flight has as yet been made, the minimum speed attainable has been observed under various conditions of engine operation, and no indication of a marked slip-stream effect on lift has been apparent. Some such effect probably exists, but it is certainly small. The minimum speed with throttle wide open is, to be sure, somewhat less than the minimum speed in gliding, but the difference is not too large to be accounted for by the lesser total lift in the first case, due to the vertical component of the thrust-balancing part of the weight of the machine directly.

Results of the Tests for Drag Coefficients

In working up the results of the tests for drag the procedure followed was in general analogous to that just described for lift. The primary curve, corresponding to the plot of inclinometer readings against speed, was one of $\frac{V}{ND}$ against angle or speed (usually the latter). Such a curve for a single flight is given in Fig. 18, each point representing a single pair of readings (of air-speed meter and tachometer). It will be noted that the points do not lie on the curve with any such exactness as do those in Fig. 14, and that they separate into little groups. Each group of points includes the readings taken during a run in a straight line and at an approximately constant speed, and each group defines a little curve of its own, the slopes of these short subsidiary curves being considerably greater than that of the mean curve connecting them. This apparent discrepancy is due to the inertia of the aeroplane, which causes it to delay appreciably in responding to changes of condition. For example, if the engine speed drops slightly from any cause, there is a distinct interval before steady conditions are restored by a decrease in air speed and an increase in angle of attack, and if the engine speed returns to its original value after a few seconds the air speed will hardly have changed perceptibly in the meantime. If, on the other hand, the air speed changes, the engine speed responds almost instantly. If, for example, the air speed increases, the angle of attack of the propeller blades against the air falls off, the resisting torque of the propeller decreases, and there is an unbalanced torque tending to speed up the rate of rotation. Since the moment of inertia of the rotating parts is small, the response to this accelerating torque is, as already noted, very rapid. The result is that N can make considerable momentary changes, producing a corresponding effect in $\frac{V}{ND}$, without appreciably affecting V, but that any change in V is promptly followed by the corresponding change in N, and the points obtained during a short run with the conditions nearly but not quite constant therefore plot as a line nearly parallel to the axis of $\frac{V}{ND}$.

The difference between successive tests was, as would be expected, greater than in the case of the lift coefficient, both because of the very large effect of vertical currents and because of the failure of the pilots in some cases to keep the path level. The extreme results for a given angle, however, seldom varied by more than 10 per cent. The errors in the determination are much greater at very large and at very small angles than at those in the neighborhood of the maximum L/D, partly because there were few tests which extended to very large angles. Even those tests which covered the full range of angles spread out widely at the ends of the curves, although very closely bunched in the intermediate portion. There was, as will be seen a little later, a marked difference between the results for the two machines, exceeding 10 per cent for a considerable range of angles. This difference can be attributed largely to the difference in the propellers, a difference already noted in the first part of the report, and it is probable that, since the propeller used on No. 2 was the more warped, the results given for the drag and L/D on No. 1 are more accurate than are those for No. 2. A test was made with the propellers interchanged, and the results obtained from No. 2 on that occasion checked very well with the mean curve for No. 1.

The mean curves of thrust for the two machines are given in Fig. 19. These curves call for no special comment, their general form being evident. The thrust for a given angle varies with the loading of the aeroplane, and the curves therefore are somewhat indefinite, but they represent the average condition in the JN in level flight satisfactorily. The thrust given in these curves is that corresponding to standard atmospheric density.

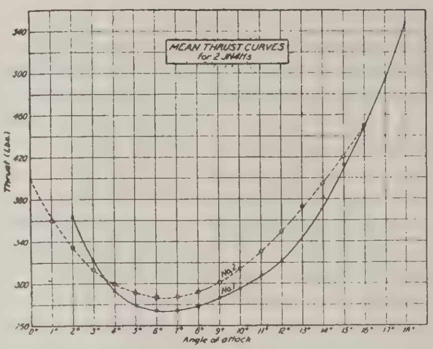


FIGURE 19.

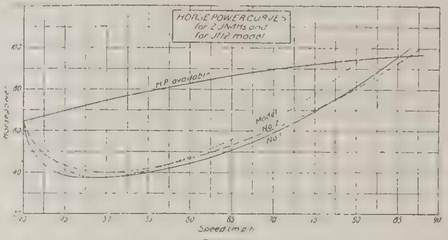


FIGURE 20

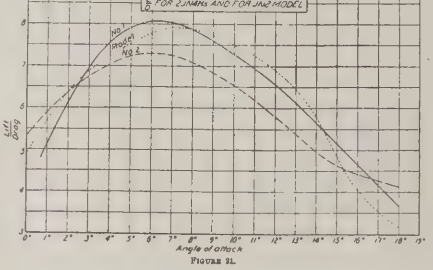


FIGURE 21.

The curves of horse power required for level flight at standard density are given in Fig. 20. The curve for horse power available is plotted on the same sheet, its form being based on the efficiency curve for the propeller, as determined at Leland Stanford Junior, and on the computed variations of engine speed with air speed, the throttle remaining wide open at all times and the engine torque being assumed constant. In order to make the intersection of the curves check with the maximum speed as determined by test it was necessary to take the engine horse power as 130 (a value which appears reasonable, as the engines had seen a considerable amount of service and would not turn up beyond 1,530 revolutions per minute in level flight with the propeller normally used on No. 1, or 1,570 revolutions per minute with that used on No. 2). It will be noted that the curves of horse power available and required have their second intersection at an angle a little smaller than the burble point. This checks very well with the observed fact that, with the throttle wide open and the machine flying level, it was not quite possible to reach the burble point. This is shown by the mean lift curves, which stop just short of the critical angle. This coincidence of computed and observed results at the lower end of the horse power curve affords additional reason for confidence in the validity of the method employed for using wind-tunnel data on the propeller in conjunction with measurements on the complete aeroplane in free flight.

The air speed for best climb is deduced from the horse power curves to be 56 miles per hour. No thorough tests on climb have been made, but the air speeds adopted by the pilots who have flown these machines, when they desired a maximum rate of ascent, have ranged from 48 to 57 miles per hour, with the most skillful and experienced pilots, in most cases, choosing a speed nearer to 48 than to 57. It appears, then, that the air speed which would be recommended as a result of the study of the curves of Fig. 20 is very nearly correct, but probably a little on the high side. This is rather surprising, as the effect of the increased slip-stream velocity with the machine climbing with wide-open throttle would presumably be to raise the speed for minimum horse power required, and the speed for best climb predicted from these curves would therefore be expected to be a little low. In any case, however, the discrepancy is small, and the climbing speed is so nearly the same for all speeds from 50 to 60 miles per hour that the difference can hardly be detected. The climbing speed for No. 1 is computed from the horse power curves to be 585 feet a minute. Although, as already noted, no accurate determinations of the rate of climb have been made, such observations as have been taken indicate a maximum rate somewhat less than 585 feet a minute. This is what would be expected, the difference being due to the increased slip-stream effect with open throttle. The curve of horse power required computed from the JN2 model test, with due allowance for the difference in weight between the JN2 and the JN4H, is also plotted in Fig. 20. It checks well with the free flight curves except at extreme high and low speeds. From the curves of thrust those for L/D can be derived, and the mean curves for the two machines, together with that for the JN2 model referred to in connection with the lift coefficients, are given in Fig. 21. The curves for No. 1 and No. 2 are nearly parallel except at small angles, where there appears a marked difference of slope similar to that which characterized the lift curves. Bearing in mind the fact that the curve for No. 1 is undoubtedly more accurate than that for No. 2, it is apparent that the correspondence between the L/D for the JN2 model and that determined in free flight for the JN4H is reasonably good. It is rather dangerous to draw fine conclusions from this correspondence, in view of the difference between the JN2 and the JN4H, but the separation between the curves is hardly greater at any point than the combined possible experimental errors, and the maxima differ by only 2 per cent (if the curve for No. 1 be taken as correct). The indication is that the slip-stream effect and the various crudities of construction on the model (such as the use of round wire interplane struts) are almost exactly counterbalanced by the "scale effect" and by the effect of the omissions of wires, fittings, etc., from the model. In order to obtain quantitative data on the slip-stream effect tests in inclined flight will be necessary.

Velocities in the Slip Stream

In order to measure the velocity in the slip stream and compare it with the velocity computed from the results of model tests on the propeller a pitot-venturi head, exactly like the one used for measuring the air speed, was attached to the forward left center section strut. The mouth of the tube was 3.92 feet behind the trailing edge of the propeller, and the axis of the venturi was 2.72 feet radially from the propeller axis. The regular air-speed head and the one in the slip stream were both connected to the same meter through the medium of two valves, which made it possible to change readily from one to the other, and to read the air speed or slip-

(*Continued on page* 657)

NAVAL *and* MILITARY AERONAUTICS

Army Planes on Flight to Alaska

As we go to press final preparations are being made by the Army for the New York City to Nome, Alaska, and return flight. The purpose of the flight, scheduled to begin July 15, is to prove the feasibility of opening up new trans-continental lines of communication which will materially aid in the growth and economic development of the country. The route will be as follows, covering 8,690 miles, round trip.

	Miles
New York (Mitchell Field) to Erie, Penn.	350
Erie to Grand Rapids, Mich.	300
Grand Rapids to Winona, Minn.	310
Winona to Fargo, N. D.	320
Fargo to Portal, N. D.	290
Portal to Saskatoon, Sask., Can.	280
Saskatoon to Edmonton, Alb.	300
Edmonton to Jasper, Alb.	200
Jasper to Prince George, B. C.	200
Prince George to Hazelton, B. C.	220
Hazelton to Wrangell, Alaska	210
Wrangell to White Horse, Yukon, C.	300
White Horse to Dawson, Yukon	250
Dawson to Fairbanks	275
Fairbanks to Ruby	240
Ruby to Nome	300

The expedition is composed of four aeroplanes of the D-H4B type which have been specially selected and equipped for the expedition. They are fitted with Liberty Motors.

As the course to be covered is in a great measure virgin flying territory many difficulties were encountered in laying out the route. Captain Howard T. Douglas, Army Air Service, left Washington on June 5th en route to Nome, Alaska, for the purpose of arranging for landing stations and supplies. His reports to the flyers will give them full information of every station and the location of emergency landing places between regular stops.

One of the immediate results expected from the demonstration is the establishment of aerial mail route with Alaska. These routes will occupy only seven days, as against thirty now necessary.

Ranchmen and others along the line of the route have cooperated magnificently with those in charge of the preparations for this expedition and are awake to the tremendous possibilities and advantages to be derived from contact between their small local communities and the great metropolitan centers of the United States. A successful culmination of this expedition will mean the closest sort of cooperation between the Air Board of Canada and the Army Air Service to the end that the North American Continent may be served by commercial aircraft from one end to the other.

A second reason which indicates, the utility of this expedition is the cooperation of the Army Air Service with the Engineering Corps and the Geological Survey for the purpose of photographing inaccessible areas in Alaska which have heretofore not been mapped. One area in particular which the Geological Survey especially desires to have photographed from the air comprises 3,500 square miles, lying north of the 66th parallel between Fort Hamlin and Circle. This area includes the upper Yukon flats and is a district which can only be surveyed by ground methods with extreme difficulty. Representatives of the United States Geological Survey have estimated that it would cost as an absolute minimum over $10,000 and would take one surveying party at least three seasons which would mean three years to accomplish this work by the present ground methods and it would then only be partially accurate. Allowing for a 50 per cent. overlap of the photographs from the air this area can be photographed from one aeroplane in ten hours of flying or approximately three days time at a cost of about $1500 and the data assembled from such a photographic map would be more accurate than could be obtained from the ground in the short time available each year.

Cameras will be used by the expedition for taking ground views at the stops and obliques and vertical views while en route. In addition cameras and films are to be provided for the photographic mapping of the area north of parallel 66° which includes the Yukon River where it crosses the parallel between Circle and Fort Hamlin. The photographic phase of this expedition will utilize Fairbanks, Alaska, as a base of operation for its photographic work. Fairbanks will also be used as base for all major repairs to aeroplanes for the Alaskan end of the flight. The United States Weather Bureau has arranged a very elaborate plan whereby weather reports may be obtained by members of the expedition along the entire route traversed and the Commanding Officer of the flight will in addition be supplied with local weather reports. The maps for the expedition have been carefully arranged and prepared by the Information Group of the United States Army Air Service.

Arrangements have been made with the U. S. Weather Bureau and the Canadian Weather Bureau to send weather forecasts each day as the flight progresses, thus giving valuable data to the flyers which will aid them in not taking unnecessary risks by running into severe storms.

The feasibility of such an expedition as this by land aeroplanes to Nome, Alaska, has been very carefully considered and even preliminary estimates of the route and landing facilities indicate the excellent possibilities of successfully carrying out the flight. With this definite information in hand permission was given by Hon. Newton D. Baker, Secretary of War, to make the flight. The Canadian Dominion Government welcomed such a flying expedition and gladly gave its authority for this expedition to fly over such parts of Canada as were necessary.

The planes will carry 117 gallons of gasoline and 12 gallons of oil which gives them a cruising radius of 4½ to 5 hours. Each plane will have an insignia of a polar bear, significant of the expedition painted on the side of the fuselage.

The personnel of the expedition will be as follows:

Captain St. Clair Street, Commanding Officer of the Alaska Flying Expedition; 1st Lieut. Clifford C. Nutt; 2nd Lieut. Eric H. Nelson; 2nd Lieut. C. H. Crumrine; 2nd Lieut. Ross C. Kirkpatrick; Sgt. Edmond Henriques; Sgt. Albert T. Vierra; M. E. Joseph E. English.

West Point Cadets Get Aeroplanes

Camp Dix, N. J.—Part of the fleet of aeroplanes assigned for the use of the West Point cadets in training at Camp Dix have arrived. A landing field has been laid out near the artillery range. One of a pair of large observation balloons has also arrived. The cadets will use the balloons and planes to observe the effect of artillery fire.

Assemble German Bombing Planes at Middletown

The Aviation General Supply Depot at Middletown, Pennsylvania, has uncrated two German A. E. G., G-4 aeroplanes, which they have assembled. The machines are of the heavy bomber type carrying over 1,000 gallons of gas. They are each equipped with two 160 H.P. Mercedes engines.

Removal of Army Air Service Depot

The War Department has authorized the removal of the Army Air Service Repair Depot at Indianapolis, Ind., to Fairfield, Ohio, where the activities of the depot will be merged with and become a part of the Wilbur Wright Depot. Upon the removal of the depot at Indianapolis, the Army will take the necessary steps to dispose of the Government buildings and facilities at that place.

Navy Planes Spotting for Fish

A regular fish patrol operating from the naval air station at Hampdon Roads, Va., has been inaugurated, and each morning at 5 o'clock a flying boat carrying pilot, radio operator and fish spotter leaves the station to aid fishing craft. The grounds from Assateague to Currituck are covered and it is stated that fish have been sighted each day and fishing vessels directed to the schools. In two instances the fishing vessels were directed to large schools of menhaden and made record catches.

Navy Balloon for International Race

Contracts have been awarded by the Navy Department for seven balloons, one balloon of 80,000 cubic feet capacity, for use as the U. S. Navy entry in the international balloon race this year. Three of the balloons will be of 35,000 cubic feet and three of 19,000 cubic feet capacity, the latter for use at stations. Contract for the gas cells for Fleet Airship No. 1, building at Philadelphia and Lakehurst, has also been awarded. Commander Ralph D. Weyerbacher, Construction Corps, U. S. N., who has been on duty at the Lakehurst station, has sailed for Germany to spend some time at the Zeppelin works in the study of the German method of airship construction.

FOREIGN NEWS

Geneva to Paris 3 H. 15 Min.

Geneva.—An aerial service between Paris and Geneva opened recently. The plane carried two passengers and mail. It was piloted by the French aviator Durafour.

The distance between Paris and Geneva was flown in three hours and fifteen minutes.

Manitoba Candidates Use Aeroplanes

Winnipeg, Man.—Aeroplanes used for advertising purposes will feature the election campaign of the members of the Manitoba government who will seek re-election under the leadership of Premier Norris this summer.

Edward Brown, Provincial Treasurer in the present Cabinet, recently took a flight over Winnipeg and expressed himself as highly delighted with the possibilities of aeroplanes in the campaign.

Two machines are already engaged in the enterprise. They will touch at least one town in every constituency. Campaign literature will be dropped from the aeroplane as it circles over the town. After landing the government supporter in the machine will address the crowd that gathers to meet it. Supporters of Premier Norris are enthusiastic over the scheme.

The machines at present engaged display an appeal urging voters to support the present government.

Germans Give Up Giant Zeppelin

London.—The greatest Zeppelin ever constructed, the L-71, built in 1918 by the Germans for the purpose of bombing New York, was surrendered to the Pulham airdrome recently.

Recent despatches from abroad have described the super-Zeppelin L-71 as being 300 feet longer than the Zeppelins which carried out bombing raids on London during the war. The airship was said to have a cruising radius of 12,000 miles with a speed of 100 miles an hour. The Germans delivered the L-71 to the British in compliance with the terms of the peace treaty.

Helium Tests Succeed in Canada

Calgary.—With reference to the statement made in London, England, by Prof. J. C. McLennan, of the University of Toronto, that arrangements are being made for the establishment of a helium plant in Canada, it is said that the British Admiralty had experiments in helium gas manufacture conducted in Calgary and that these were so successful that the compressed helium which was the product was sent to the Admiralty in special containers. In every respect the experiment was satisfactory and helium gas will be a regular Alberta product. It is better than hydrogen for air navigation purposes, as it is not inflammable. It is extracted from the natural gas which is supplied the city of Calgary, and after the extraction the residue gas is turned back into the mains and its illuminating virtues are not adversely affected.

It has been proposed to establish a big commercial helium extraction plant near the mouths of the wells from which Calgary's gas supply is obtained.

Woman Aviator Flies to 21,325 Feet

Paris.—Louise Favier, a well-known French woman aviator, recently broke the world's altitude record for women by reaching a height of 6,500 meters (21,325 feet) She was piloted by Lieutenant Bossoutrot, who recently broke the world's record for continuous flight in the aeroplane Goliath. She attained that altitude in thirty-five minutes.

The Italian Transatlantic Airship

The B 34, the airship which has been built in Italy with the object of making a trip from Rome to Buenos Aires, was taken out for a brief trial flight recently but no details of the results obtained are available. The airship, the envelope of which has a capacity of 50,000 c.m., has an aluminum gallery, in place of the usual nacelle, which is said to be capable of accommodating comfortably 100 passengers.

New Martinsyde Speed Record of 161. Miles Per Hour

Mr. F. P. Raynham, piloting a Martinsyde "Semi-Quaver" machine, with 300 h.p. Hispano-Suiza engine, put up a new British speed record over a kilometer. His average speed both ways worked out a 259.75 kilos per hour (161.434 m.p.h.). The *Certificates of Performance* of both these were issued a fortnight ago.

Japan to Trade by Air

Washington.—Advices from Tokio state that the Japanese plan to have commercial aerial routes in operation in the near future. A well-known company in Japan has secured the agency for the Handley-Page hydroaeroplane and the French Breguet hydroaeroplane. The Company will also import a Curtiss flying boat. A competent staff of aerial experts has been secured and the firm expects shortly to demonstrate the uracticability of the hydroaeroplane as a commercial factor.

It is said also that the firm proposes to open a school to train pilots for concerns purchasing machines. The school will be in charge of a former member of the American air forces in France. Air routes to China, Corea and Siberia are contemplated, as well as trade routes in Japan. Congestion of all means of communication in Japan at present is said to be such as to give unusual opportunity for the launching of a commercial aerial enterprise.

French Aeroplanes to Police Sahara

Paris.—While little advantage is anticipated from the suggested use of commercial aeroplanes over the Sahara Desert, the French Commission has just urged the Fovernment to increase the allotment of planes for military purposes, particularly as a means of convincing the native tribes of French prestige.

The Arab tribes, according to the report, show their heels whenever fliers appear, and as a supplement to the desert police aviators are able to do great pioneer work. The desert country is navigable for planes now, but it is pointed out that the Government must develop a system of meteorological information, as well as establish a chain of relief and petrol stations along the higher ridges.

The territory, so far as the French are concerned, contains only mineral wealth, which is much too costly to move by aeroplanes when pack mules and camels can be obtained.

Aerial Mail in Algiers

On his Nieuport hydroplane, Sadi Lecointe, with Capt. Coli and his mechanic carried out a trial postal service between Bizerta and Algiers on June 6. Starting at 11.25 they came down at Algiers at 16.55 p. m.

Australia's Gifts Replaced

By way of reciprocating the gift of 41 aeroplanes from citizens and organisations in Australia to the Royal Air Force during the War, the Air Ministry has now handled over to the Australian Air officers in London, 28 machines of the De H 9 type, fitted with Siddeley-Puma engines. This gift, which is in addition to the 100 machines given as a nucleus of a Commonwealth Air Force, will be shipped towards the end of this month.

A Record Weather Balloon Ascent

Somewhat of a record, for this country, at any rate, was created recently, when a weather balloon sent up from Cranwell, Lincolnshire, England, was kept under observation continuously until it reached the altitude of 110,000 ft. or 20¾ miles. It was only at the highest point observed that the wind attained the force of a gale.

1,000 Mile Trip by "R 33"

The "R 33" recently returned to her station after an instructional cruise of about a thousand miles, which practically embraced the whole of England except the extreme southern parts.

The vessel was in the air 24 hours. When she left Howden she turned north, crossing the coast line at Scarborough. Passing over the North Sea she came in again near the Tyne, crossing Barrow and Newcastle. Then she went north again, but before reaching Edinburgh veered southward, and passed over Manchester and Liverpool, across Cheshire, and on to Birmingham, Leamington, Bedford, and Pulham, after which she took the east coast route back to Howden.

Darracq-Talbot and Sunbeam Merge

London.—It has been announced that the Darracq-Talbot car interests have been combined with the Sunbeam companies of Wolverhampton, England. The Darracq-Talbot fusion came about last autumn, and though the Darracq factory is in France, the capital is British. The Talbot company was originally Anglo-French and was known as the Clement-Talbot, the firm's name denoting the parent product of the French Clement company, while Talbot is the family name of the English peer—the Earl of Shrewsbury and Talbot—who was chief director and pioneer of the British company.

The Talbot works cover about 20 acres in the North Kensington area of London, and used to be accounted very up-to-date in plant and methods. The Sunbeam company is one of the oldest British motor car companies, and has stuck steadily to the car side of the industry. In more recent years it has become, and continues to be a very live company, reflecting the personality of Louis Coalaten, its technical chief.

Aircraft engines absorbed its chief attentions during the war. It is not too clear what improving effect is looked for from this fusion excepting as regards purchase of materials, and preventing overlapping competition with the same type and category of car. Before the war, Talbot and Sunbeam cars were strong competitors.

The Darracq-Talbot interests some time ago acquired the business of Whitehead of Leeds, the leading leaf spring manufacturer for automobiles in England, and also own the Heenan & Fronde business at Worcester and Manchester, an important product of which is the well-known water absorption dynamometer largely used for testing engines.

Limousine Aeroplane for Deschanel

Paris—President Deschanel of France may seek restored health in the pure air of a high altitude. It has been learned that in addition to the limousines attached to the Elysee Palace, there has been fitted out a de luxe Farman aeroplane in which the President can tour about, either alone or with his whole family. There are places for six in the inclosed compartment, beautifully furnished with electric lights, silk shades, a thick woolen carpet, bouquet holders and mirror, with six windows around the cabin.

The Presidential baggage can be kept near the pilot and mechanician. Near the fuselage is a tiny dressing room and place for the wardrobe. There are tables for card games and a dinner service like in an American Pullman car.

While the President has not used this new idea in the way of a state coach, he at least has the satisfaction of knowing he has put one over on the Bourbon king, who, for all the luxury of their gilt carriages, had to rumble along close to the ground. Followers of aviation now await for M. Deschanel to inaugurate a fad for flying machines among the notables of society.

The River Plate Aviation Company

The River Plate Aviation Company has shown a good deal of activity lately. Major Kingsley of the R. A. F. has just completed the first part of his tour through the northern part of the Republic. He expressed complete satisfaction at the interest shown in flying by the people in the country towns, although he did not find it easy to convince them of the utility of aeroplanes in those remote places.

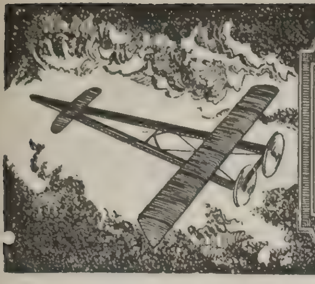
Lieuts. Thompson, Hasset and Baker are carrying out passenger flights in other parts of the country with 90-h.p. D.H.6s.

The French, represented by Prieur on a Bréguet, and the U. S. A. by Lawrence Leon on a 90-h.p. Curtiss, continue making passenger flights.

Most of the passenger-carrying for short flights by the River Plate Aviation Company is done with de Haviland 6s with 90 R. A. F. engines. The French are using Farmans and Bréguets.

Another Trans-Atlantic Attempt

It is reported that the Argentine pilot, Zuloaga, intends to attempt to cross the Atlantic. Starting from Palos in Spain, he hopes to do the trip in the following stages and times: Palos-San Vincent, 16 hours; San Vincent-Pernambuco, 16 hours; Pernambuco-Rio, 11 hours; Rio-Buenos Ayres, 11 hours. No particulars are available regarding the machine which Capt. Zuloaga will use in the attempt.



ELEMENTARY AERONAUTICS
and
MODEL NOTES
By John F. McMahon

THE CONSTRUCTION AND DESIGN OF "AVIETTES"

OUR readers have on doubt read the offer of the Aerial League of America to donate $1,000.00 as an "Aviette Challenge Trophy" to be competed for annually.

Perhaps every reader does not know what an aviette is. It is simply a bicycle or motorcycle equipped with wings. The bicycle has been the most successful so far.

Some have used a biplane construction while others have used the monoplane. The one used by Gabriel Poulain was a biplane having the lower wing on a line with the seat the upper plane being about 3½ feet above. The upper plane had a spread of wing almost twice as much as the lower. Another point of interest regarding the above machine is the fact that he used a wing section having a true stream line shape rather than one with a combined surface. This was evidently selected to keep down resistance. To get a lifting action on the wings he would change them from a zero angle of incidence to about 3 degrees which would take him about four feet in the air for a distance of 40 or more feet.

To help in keeping down resistance he built a tapered form behind him that allowed the disturbed air to take its place without too much disturbance.

No tail or rudder was employed; the control simply dependent upon the wind and position of the pilot to bring the center of gravity a trifle ahead of the center of lift, a combination which allows the machine to be pulled off the ground, at the same time maintaining a good gliding angle.

To help the reader who would build machines to enter into this combination I have gathered together data that will be of help in picking the proper wing curves, biplane combinations, etc., as well as the methods employed in figuring out the proper size of wings.

In designing an aviette, there is really no set way of arriving at the proper proportions. We generally figure out the approximate total weight and then make our wings large enough to take the weight.

No aeroplane wing will lift a certain weight when traveling at a speed of say 40 miles per hour, at an assumed angle of 3 degrees. As the angle is increased and the speed stay the same, the lift will be increased, and, of course, the resistance will be greater as well.

If the angle is kept at 3 degrees and the speed increased the lift will be greater and again the resistance increases. From this we see that to increase the lift either the angle can be increased or the apparatus speeded up.

However, this would be the case where we had reserve power but in the common type of aviette where the power for driving the machine is simply derived by pedalling along the ground until sufficient ground speed has been attained, when the wings or tail are moved to give the proper angle to the lifting surfaces and the machine leaves the ground until the speed drops off and the machine touches the ground again.

Of course we must not forget the fact that the aviettes are generally headed into the wind which would allow the machine to take off at a slower ground speed than if no wind was blowing or if the wind was in the same direction as the aviette was traveling.

The total weight of an aviette and pilot is about 250 lbs. The speed at which the machine should take off is 20 miles per hour.

We now have two known requirements to overcome and to familiarize our reader with the method of arriving at the proper size of wings in a simple way without corrections for end losses and such things that would puzzle the reader when the simple figures will give an answer near enough.

There are six U. S. A. wing curves showing the decimal fractions of the chord for laying out the curves. The coefficients are headed Ky which is the symbol for lift and Kx which is the symbol for drift or resistance. Now the reader can see that if a square foot will lift 1 lb. at 10 miles per hour, it will lift much more at 100 miles per hour and less at 1 mile per hour. Now the figures under Ky show the lift of a square foot of wing at 1 mile per hour. Assuming the wing curve we will use is the U. S. A. No. 1 at an angle of 1 degree. Looking in the column headed Ky alongside 1 degree we have .000936 or the wing will lift .000936 pounds at 1 mile per hour for every square foot of the surface. This is for 1 mile per hour but we will need to know it for 20 miles. Now the speed does not increase in proportion to the speeds of 1 and 20 miles, but with the square of the speed which is 1 (the square of one) and 400 the square of 20. Then to find the lift at 20 miles per hour we simply multiply .000936 by 400 and find an answer of .3744 lbs. per square foot. Then the U. S. A. No. 1 surface will lift .3744 lbs. for every square foot when traveling 20 miles per hour. Now we assumed the total load to be 250 lbs. To get the proper size of wings we simply divide 250 by .3744 and get an answer of approximately 667 square feet needed.

We now know that 667 square feet of surface is needed to sustain 250 lbs. in the air when traveling at 20 miles per hour, when the U. S. A. No. 1 curve is set at an angle of 1 degree.

The lift per square foot at 1 mile per hour is given for each degree. Of course we know the lift changes according to the angle of attack and we must be sure to change the proportion according to the square of the speed.

The resistance is also figured in this way and for example I will show how to arrive at the total resistance of the wing having 667 square feet and a speed of 20 miles per hour. I might mention that the resistance also increases in proportion to the square of the speed. Looking under Kx alongside 1° we find .0000670. The resistance for each square foot at 1 mile per hour, then if we multiply this by the square of 20 which is 400, we get .0268 lbs. the resistance of each square foot at 20 miles per hour. We have 667 square feet so multiply .268 by 667 and the answer is 17.8756 or nearly 18 lbs.

The foregoing was for a simple example only but the method should be understood and the figures used for other angles of incidence.

We could not use 667 square feet as the machine would be too clumsy but we can use a larger angle of incidence and less wing surface.

Knowing the weight it is easy to pick out the proper angle or a certain size wing.

Let us assume we have a wing of 150 square feet and we want to find the proper angle to set it. Our weight to be lifted is 250 lbs. the speed is 25 miles per hour which would be the air speed if the machine was traveling 20 miles and the wind blowing 5 miles. The square of 25 is 625 and this multiplied by 150 equals 93750.

The next step is to divide 250 pounds by 93750 which is .0026.

Looking under the Ky column we find this in some wing curves to come alongside 10 degrees in others at 8 degrees. It is good practice to select the wing curve that shows the lowest resistance at that coefficient of lift.

Now that we know how to figure the angles and proper sizes of wing we will proceed. The column at the extreme right tells the point where the center of pressure occurs at each angle of incidence which we must know when determining the proper location for the center of gravity. The reader will notice that the center of pressure advances toward the leading edge as the angle is increased and moves to the rear as the angle is lessened. The distance is given in fractional parts of the chord, so the reader can lay out the wing curve for any chord.

For instance suppose the chord to be 4 feet or reduced to inches, 48 inches. We then lay off a line 48 inches long and space it to ten equal spaces. The first space is divided into five spaces, the first two are ⅛'s of the space the other three ¼ spaces.

Starting from the left the lower line is plotted according to the dimensions shown, and when this is finished the upper one is plotted.

(Data on wing curves to be given next week.)

Aeronitis

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Pass Out the Wings

There was once a fine Naval flyer,
Who went soaring higher and higher
When old Mars he passed,
He ran out of gas—
A short prayer and hymn by the choir.

—*Naval Air Current.*

Just Like That

Whether the campaign to make it the aviation centre succeeds or not, Washington will always be the national air base.

How Cruel!

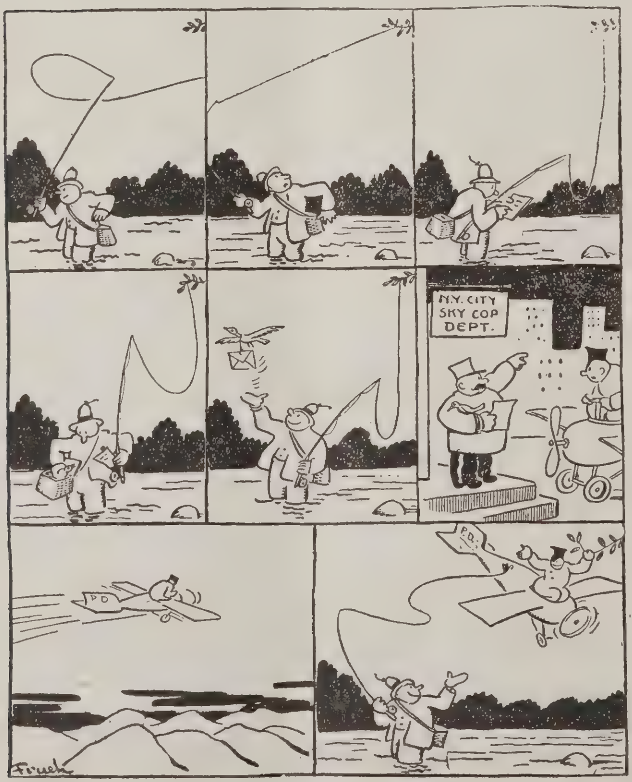
Dido: "Do you remember when you were first struck by my beauty?"

Aviator: "Yes, dearest. It was at the masked ball."—*Sun Dial.*

Mistook the Knock

Reckless Pilot: "Hear them cylinders knocking?"
Timid Passenger: "It's not the cylinders, it's my knees."

VACATION TIPS.


N.Y. CITY SKY COP DEPT.
P.O.
P.O.
Frueh

Courtesy N. Y. World

A New Idea

Dere Mister Editer:—

I was talking to my friend Abe on the telingphone and he informed by me that the army is buying it a new aeroship. He says, "I got it an idea for the machine."

I says, "What's the matter, Abe, are you using brilliantine on your hair?"

He says, "You know I am connected with the best people in this town,—by telephone. Vell, I am going to ask it them, should they vant to spend it the week-end by the seashore in the same house they live in in New York."

"Vait a minute," I says, "I'll call it the doctor. Ain't you feeling vell, or haf you been to Washington and got it mixed up by the hotter-than-air experts there?"

He says, "You don't understand aero-dynoomics. Dot is a subject vot only ve of the upper classes vit elevated intelligous could diagnosis it.

"The Army wants it a test for the new dirigiblimp. My idea vot I half is a practical one. All vot is necessary for the experiment is some vun vot wants it to by the seashore stay vitout taking it the suitcase and trunks. The idea is simple, in fact so simple that I vas simple for not thinking of it before."

"Dot is simply a shame," I says.

"Vell," he continued, "you see I shall tie it a chain around a house in New York, den call the Army up and send for it the aeroship. Ven it comes hook the chain on the aeroship and sail to the seashore. Ven the folks in the house vant it to come back to New York, dey call it up the Army vonce more again, and fly back mit the house."

"Abe," I says, "dot's a vonderful idea. Come around and make it der preparations mit me. You can take my mother-in-law and her house der first trip."

So you see I think I am always villing to help der aviation problems get solved.

Hoping ve try dis experiment soon, I am,

Isidor O'Brien.

A New Movement

"What is this volplaning any way?"
"Sort of a back to the soil movement I suppose."

For Sale: A pair of aeroplane wheels; can be used on any baby carriage.

Wanted: Old tomato cans. Wingtip Pontoon Corp.

A Just Complaint

A coal-heaver's "feelings were hurt" by the unthoughtful actions of his children.

"Mary," expostulated this man to his wife, "don't I always tell you I won't have the children bringing in coal from the shed in my best hat?"

"Oh, why should you care?" demanded the wife. "You've sp'iled the shape of that hat already, and what can a little extra coal dust do to harm it?"

"You don't see the point," protested the husband, with dignity. "I only wears that hat in the evenings; and if, while I am out, I takes it off my head, it leaves a big black band 'round my forehead. What's the consequence? Why, I get accused of washin' my face with my hat on, and it ain't nice, Mary; it ain't nice!"—*Harper's.*

The American-French Aero Exposition, Inc., announces that it has purchased

International Aircraft Advertising Agency, Inc.

15-17 West 44th St., New York **Suite 803-804**

Telephones Vanderbilt 7686-7642 **Cable Adress: AMFREX**

A Word to the Wise Dropped from the Skies

The aeroplane is in itself a novelty. Circular spinning and diving from a machine, when witnessed by an observer, represents a peculiar value, the cause of which it is difficult to describe. Advertising distributed from our aeroplanes is surrounded by an atmosphere of romance sufficient to cause people who ordinarily would not even glance at advertising literature to scramble eagerly in their efforts to secure as many copies as possible. These are taken to their homes and offices, where they are exhibited to visitors as costly souvenirs.

The experience gained while touring some of the Southern States as the Fifth Liberty Loan Circus, demonstrated that "bombs" and dodgers and other advertising material fluttering from the sky into crowds is practical.

From your own experience, you realize that AERIAL ADVERTISING is a striking and efficacious method of presenting your product to the masses, and we have worked out several novelties unique in color and original in design, which will interest you. Compared with the results obtained, our rates are lower than you are now paying for newspaper and magazine space, and we can accomplish your aim efficiently and at less expense than you can do it by any other means.

We have a large staff of aviators and practical men in our employ for the mechanical part of our work, and in addition we have the advertising men and means of making your aerial advertising of extraordinary value. One of our representatives will gladly call upon you and outline our plan, without obligation.

This company maintains a register for Pilots, Aeronautical Engineers, and Mechanics available for aviation companies seeking the services of such. The above are invited to register their name, address, class of work, and salary expected. There is no charge to the companies or those registering for such service.

(*The agency will be glad to hear from aviators and companies, or balloonists who have balloons, available for advertising purposes in any part of the world and who are in a position to undertake and carry out business of this kind. Information in regard to* **special** *Aerial Routes in the United States furnished on application to* **prospective advertisers.**)

BARGAIN SOPWITH CAMEL

Single seater Biplane—span 27 feet.
Powered with 150 H.P. Bentley (B R 2) radial motor.
High speed—135 M.P.H.
Landing speed—37 M.P.H.
Climb—7000 feet first 5 minutes.
Ceiling—22,000 feet.
Gasoline consumption at maximum speed 11 gallons per hour.
Endurance at high speed approximately 4 hours.
Endurance at cruising speed approximately 5 hours.
Oil capacity about two hours in excess of gas supply; complete with all motor instruments, including air speed indicator, tachometer, compass and banking indicator.
This machine has been flown 14 hours; is in perfect flying condition; is complete and with the following spares.
Demonstration at flying field, Copiague, L. I.
Price—**$3,000,** includes shipping crate.

NEW PLANE PARTS

1 set upper wing panels with ailerons.
1 set lower wing panels with ailerons.
1 center section.
1 horizontal stabilizer 1 vertical stabilizer
1 set elevators.
2 rudders.
1 landing chassis complete with wheels and tires.
2 landing chassis wheels with tires.
1 complete set interplane struts and streamline wires.
1 complete set center section struts and streamline wires.
1 propeller.
1 engine mounting nose plate. 1 engine cowl.

NEW MOTOR PARTS

Miscellaneous
Connecting rods.
Cylinders.
Cylinder heads.
Piston rings, pins, bushings, cylinder hold down struts, valve tappets and push rods, exhaust and intake valves and springs, oil pumps, crankcase front and rear mounting plates, etc.
Also miscellaneous instruments, etc.

R. E. LAYMAN, 280 Madison Avenue, New York City

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

(Continued from last week)

Road Completed After Armistice

On November 14, after the armistice, Col. Stearns wired Col. Disque at Cincinnati that Mr. Sawyer (superintendent) and Mr. Earling (western manager) of the Milwaukee "strongly recommended finishing of 14 miles of track laying and ballasting of Siems-Carey road into Lake Pleasant, basing opinion on increase salvage value of completed road" (p. 2384).

The Siems-Carey-Kerbaugh road was then completed after the armistice at Government expense, and 40 per cent of its track and ballasting was thereafter laid.

A Siems-Carey-Kerbaugh sawmill, built at 7 per cent cost-plus progt, which cost the Government $2,395,345 (p. 2859), was appraised with the railroad at a salvage value of about 10 per cent of its cost.

Director Ryan said of this mill, in his letter to the Secretary of War (p. 100):

"My own opinion is that it was absolutely necessary. . . the two mills were built on the cost-plus contracts, as stated . . . Carey stated at the beginning of negotiations in which I had part that they did not expect to ever secure any profit from the contract except to the extent that they were able to amortize and reduce the cost of the plant to the Government and take it over on an appraisal that would enable them to engage in the lumber business. That was, I believe, the chief incentive in their making the contract and never disguised, as far as I know."

As the milling capacity on the coast reached 30,000,000 feet daily on an eight-hour shift, and testimony of the United States Foretser (Ray report) and others claimed these mills were "clearly unnecessary," the responsibility for authorizing such expenditures is chargeable to those in authority, and Mr. Ryan's immediate knowledge and views are set forth by himself in the testimony submitted.

In other words, the Siems-Carey-Kerbaugh mill, which cost the Government $2,395,345, and the $4,000,000 commercial railway built by the same parties aggregated about $6,400,000 apart from their $23,000,000 spruce contract. If a railway to Clallam Bay, as recommended by the Government engineer and other reputable men, had been built, it is claimed it would have gotten out timber in less time and at a cost of $400,000 saving approximately $6,000,000 to the Government subject to salvage.

Salvage Value of Railways

At the conclusion of business, February 15, 1919, the following statement was filed by the spruce Army officials (p. 2859). Settlement with Great Britain was made on a 10 per cent estimated salvage value. (See Schedule A.)

Exhibit 11

Approximate Balance Sheet of United States Spruce Production Corporation, Portland, Ore., as of February 15, 1919.

ASSETS

		Book value	Estimated salvage value
Cash		$8,946,471.45	$8,946,471.45
Advances		330,688.57	325,000.00
Accounts receivable:			
Airplane lumber—			
British	$4,836,235.68		
French	3,228,849.27		
Italian	1,122,240.32		
United States accounts	2,480,390.84		
	11,667,716.11		
Commercial lumber	509,534.08		
General	59,310.01		
Cost-plus contractors	430,790.01		
		12,667,350.21	12,667,350.21
Lumber inventories:			
Airplane, 4,132,890 feet, at $18	74,392.02		
Logs, 48,027,345 feet, at $10	480,273.45		
		554,665.47	554,665.47
Property (see Schedule A attached)		23,285,581.39	3,908,000.00
Due from quartermaster, U. S. Army, construction of cantonment		12,667.17	12,667.17
Balance due on debentures		3,500,000.00	3,500,000.00
Total assets		49,297,424.26	29,914,154.30

SUMMARY

Liabilities	$48,527,871.48
Assets, expected to produce	29,914,154.30
Anticipated deficit	18,613,717.18

Schedule A

Property Accounts.

	Cost	Estimated salvage	
		Per cent	Value
Land and timber lands	$775,696.68	....	$745,500.00
Haulage equipment	951,512.77	25	238,000.00
Donkey-engine equipment	1,475,783.86	20	295,000.00
Railroad equipment	651,933.13	20	130,000.00
Railroad equipment (rails, etc.)	1,000,000.00	....	250,000.00
Marine equipment	85,191.09	20	17,000.00
Towage and rafting equipment	49,825.95	25	12,500.00
Tools and appliances	600,146.34	10	60,000.00
Furniture and fixtures	354,469.86	20	71,000.00
Railroad construction	8,742,100.20	....	750,000.00
General construction	69,449.20	....	....
District construction	191,349.76	....	....
Camp construction	1,083,932.80	....	....
Construction overhead	322,265.56	....	....
Construction, Siems-Carey-H. S. Kerbaugh Corporation sawmill	2,395,345.14	10	239,000.00
Construction, Vancouver cut-up plant	1,100,073.31	....	100,000.00
Construction, Toledo mill	985,487.73	....	200,000.00
Construction, Vancouver warehouse	21,710.79	....	....
Supplies on hand	2,402,790.58	33⅓	800,000.00
Stumpage rights	26,516.64	....	....
Total	23,285,581.39	....	3,908,000.00

Estimated salvage of property that cost $23,000,000 at about $4,000,000, including railroads at less than 10 per cent of their cost, is an estimate filed nearly a year ago. The cost of the logging railroads was as a matter of fact practically $10,000,000 (p. 1593). With a large force of officers and civilians at Portland waiting to get "reproduction" figures, as proposed by Col. Stearns, now in charge, this Government property should be closed out on some basis without further delay.

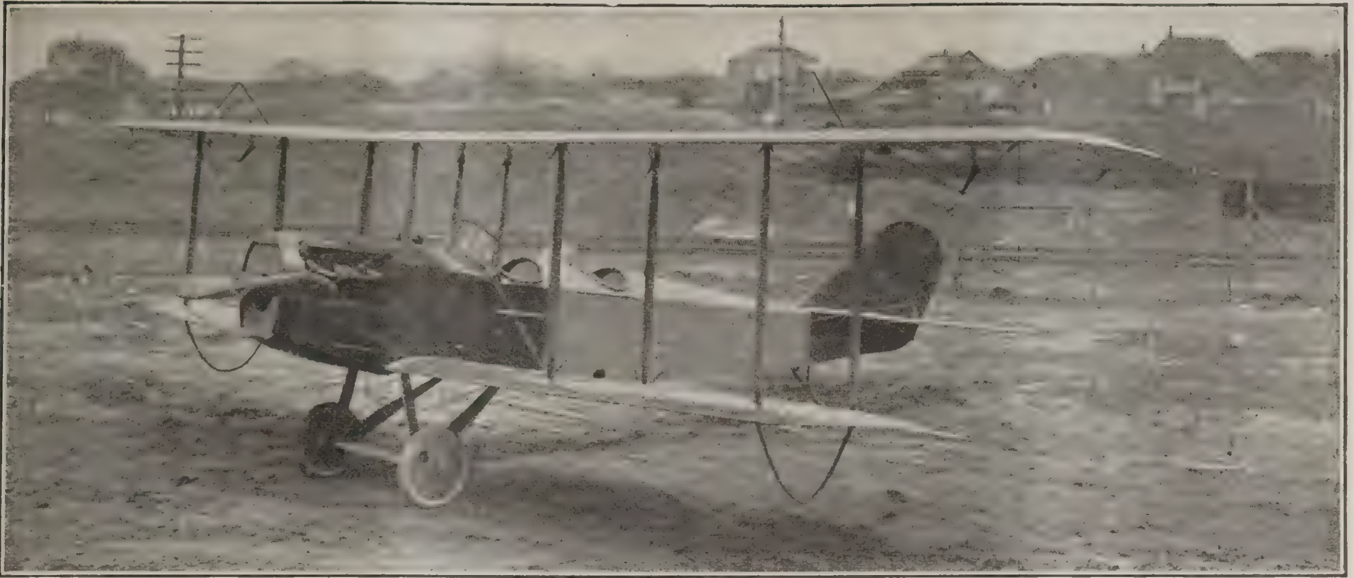
Carey's $30,000,000 Cost-plus Contracts

Additional matters give a better understanding of the remarkable Siems-Carey cost-plus contracts. Senator Donlan, of Montana, who was given charge of Carey's logging operations under the $23,000,000 Carey spruce contract, was strangely brought into the operations. With no previous dealings ever mentioned with any of the parties he was picked up at Missoula, Mont., on their way to the coast, and given a one-sixth interest in the $23,000,000 contract.

In the hearings Witness Cain, president of the Port Angeles & Grays Harbor Railroad Co., claimed to have been frozen out, first, by Col. Disque's criticism against Douty's English negotiations, and afterward by the commandeering of Muellers Pass for Carey's road in the name of the Government. Mr. Cain also testified that Senator Donlan, Carey's logging superintendent under the spruce contract, told him that "Carey was a partner of Ryan" (p. 2593), referring to John D. Ryan, Director of Aircraft Production, and that he (Donlan) was leaving Carey's logging operations (August, 1918), because "they want me in Montana to run for Senator. . . . Mr. Ryan has big interests over there and would like to have me over there" (p. 2593). Senator Donlan also told Mr. Cain that he "was in the lumber business and also in the water-power business with Mr. Ryan . . . He appeared to control water powers that Mr. Ryan developed for the Milwaukee Road" (p. 2890).

Mr. Ryan and Senator Donlan both testified before the committee as to former business connections, but claimed that their present relations were somewhat strained. It is generally understood, however, that the Anaconda Copper Co. is politically active in Montana; that Mr. Donlan has been State senator for many years, representing the same town in which Mr. Ryan formerly lived, and that they had been engaged in business together, and that Mr. Donlan formerly had charge of the Anaconda Co.'s logging work. Senator Donlan asked permission of the committee to testify, which right was given. He generously came from Missoula, Mont., to New York and returned, a distance of about 5,000 miles, without receiving or asking any witness or mileage fees.

(To be continued)



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150 H. P. HISPANO-SUIZA MOTOR

Slow Landing Speed
Quick Take Off Fast Climb
Remarkable Durability

Built for business and pleasure. A demonstration convinces the prospective purchaser.

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Walter T. Varney, 832 Post St., San Francisco, for Northern California, Arizona, and Nevada.
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Harry Hiles, Cheyenne, Wyo., for Southern Wyoming.
Northwest Aircraft Corporation, Newell, S. D., for Western South Dakota.
Erick Aviation Company, Erick, Okla., for Western Oklahoma and Pan Handle.

(*Continued from page* 650)

component, the magnitude of this swirl varying with the air speed and engine speed. The air therefore meets the tubes obliquely, and the reading of the meter is probably lower than the true velocity. The error in velocity should not, however, be more than 5 per cent, and the results obtained will at least serve to give an idea of the relation between slip-stream velocity and the factors which control it.

The procedure in these tests was to set the throttle at a fixed position, and to fly the machine at a number of different air speeds without moving the throttle (these flights, of course, were not level). The air speeds used for each throttle setting ranged from 90 to 42 miles per hour, with an occasional dive to 100 miles per hour or a little more. The radio of slip-stream velocity to air speed for a given propeller depends only on $\frac{V}{ND}$ and these quantities can therefore be plotted against each other. This has been done in Fig. 22, and it will be noted that nearly all of the points lie close to a smooth curve and that there is no distinct break between the sets of points taken at different throttle openings. The only points which do not fit the curve are those which were taken with the engine throttled down to a very low speed, so low that the propeller was giving no thrust. The slip-stream velocities under this condition were lower than they apparently should have been.

The dotted curve in Fig. 88 represents the velocity ratio computed from the thrust coefficients by the method described in Report No. 71. This curve checks very well with the other one, and this check indicates that the thrust coefficients as determined in the wind tunnel held for the full-sized machine, and that they are not very materially affected by the presence of the body. Of course, this check is only a rough one. To secure an accurate comparison between the theoretical and actual values it would be necessary to sound the slip stream thoroughly, measuring the velocities at many points, but previous experiments (by Eiffel and others) indicate that the velocity is nearly constant over a large portion of the propeller disk area, and readings at a single point therefore give some indication of the average condition. It appears that interference between the propeller and the other parts of the aeroplane cannot have a very large effect, as any very notable increase in thrust due to the presence of the body would lead to an increased slip-stream velocity. Experiments at the Royal Aircraft Factory[1] on a pusher biplane, have shown a similarly excellent check between the calculated and measured slip-stream velocities.

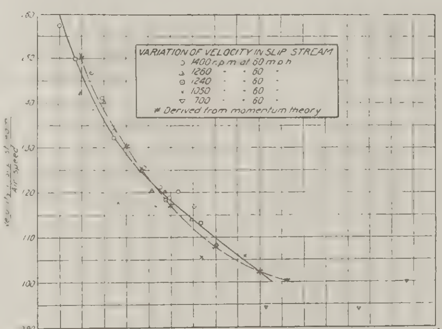

FIGURE 22.

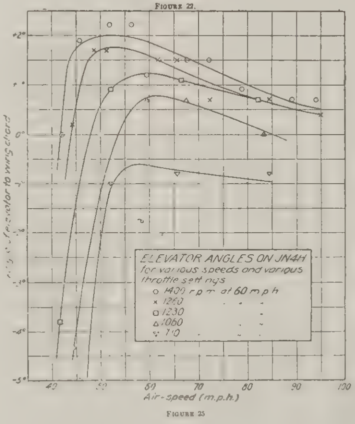

FIGURE 25

The maximum slip-stream velocity with the machine stationary on the ground and the engine turning 1,400 revolutions per minute was about 80 miles per hour. The velocity was very unsteady under the conditions, the meter reading varying by about 6 miles per hour almost instantaneously. This irregularity of flow was no doubt due in part to interference of the ground, but the flow in the slip stream was in general more irregular, and the velocity fluctuated more rapidly and through a larger range at low speeds than at high.

---

[1] Experimental Determination of the Slip Stream Behind the Air-screw of a Pusher: British Advisory Committee for Aeronautics, R. & M. No. 382. 1916.

(*To be continued*)

THE HOME INSURANCE COMPANY NEW YORK

ELBRIDGE G. SNOW, President

Home Office: 56 Cedar Street, New York

AIRCRAFT INSURANCE

AGAINST THE FOLLOWING RISKS:

1. FIRE AND TRANSPORTATION.
2. THEFT (of the machine or any of its parts).
3. COLLISION (Damage sustained to the plane itself).
4. PROPERTY DAMAGE (Damage to the property of others).

SPECIAL HAZARDS

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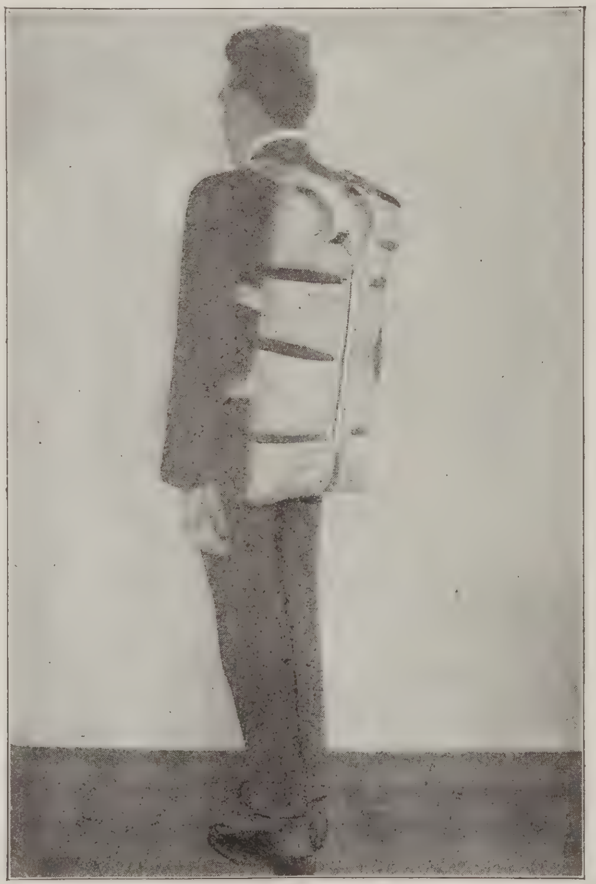

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(*Continued from page* 646)

The company was incorporated with the plan of overhauling and rebuilding all types of aeroplanes, aeroplane motors and the building of spare parts for same, and their factory is already equipped for this work.

The field will have a supply of gasoline, oil and miscellaneous spares, and an expert mechanic will be available at all times to take care of the needs of the flyers.

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Mr. Boyle has been an engineer in lighter-than-air craft for several years and was assistant to Major Baldwin in the work of building dirigibles and balloons for the Government.

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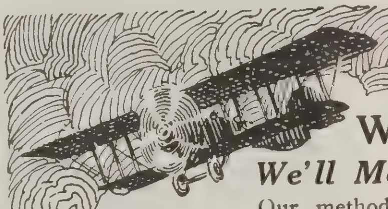
Hammondsport is once more about to experience a return of the olden days, when aeroplanes and flying boats were circling their field and lake at all hours of the day. It is understood that flying boats will be operated from Lake Keuka and make frequent trips to the other Finger Lakes. Land machines soon will be making trips daily to different cities in the vicinity—Elmira, Rochester and Buffalo. The little village where Mr. Curtiss first started his experiments will once more become a center of aircraft work, both in heavier and lighter-than-air machines.



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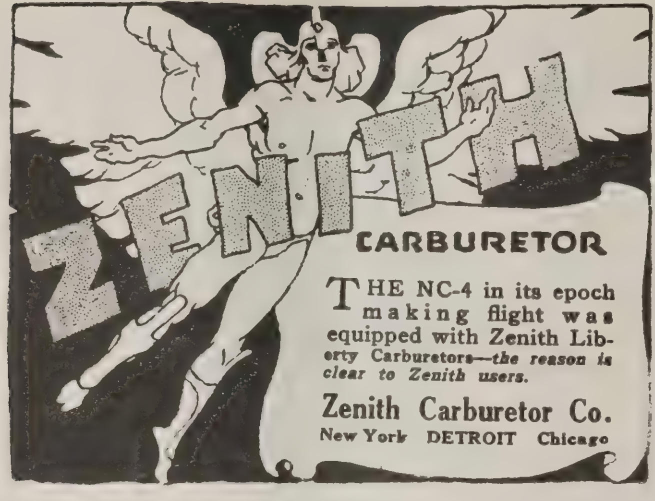

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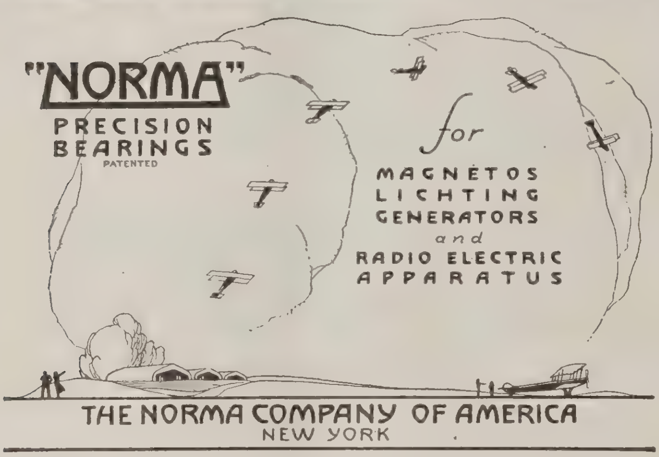

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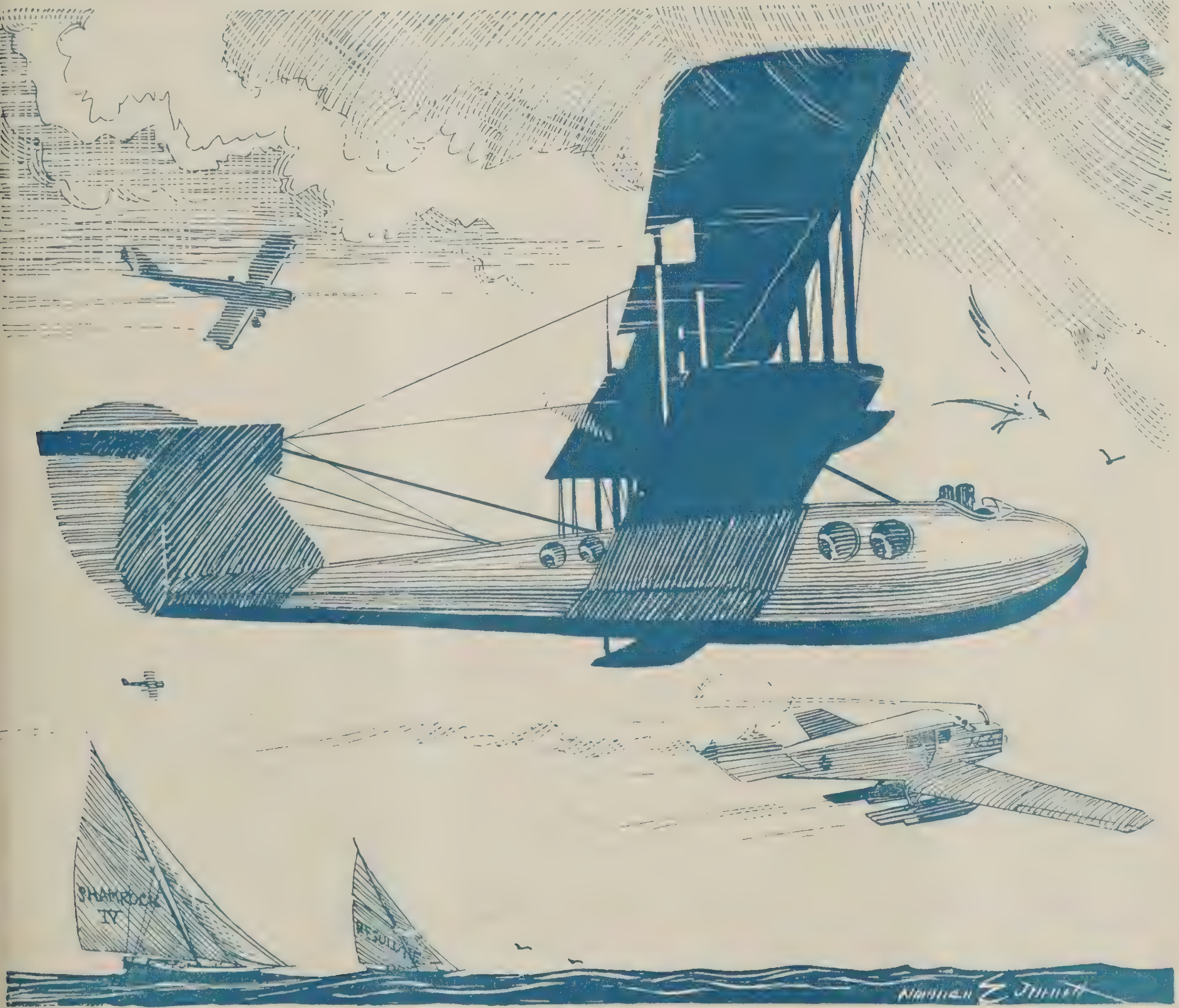

The Sport Supreme

Courts Asked for Injunction to Help Aero Club Maintain its National Leadership

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riptions: Domestic, $4; Foreign, $6. Entered as second-class matter March 25, 1915, at the Post Office at New York under the act of March 3rd, 1879

In an early issue of

Aerial Age Weekly

an official announcement will be made of consummation of plans for establishing an

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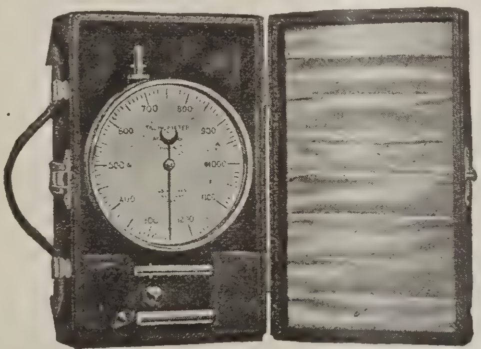

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WEEKLY

VOL. XI JULY 26, 1920 NO. 20

TABLE OF CONTENTS

PAGE

Courts Asked for Injunction to Help Aero Club Maintain its National Leadership 671

The News of the Week 675

The Aircraft Trade Review 676

Preliminary Report on Free Flight Tests 677

Notes on the Theory of the Accelerometer 681

Naval and Military Aeronautics 683

Foreign News 684

Elementary Aeronautics and Model Notes 685

Aeronitis 686

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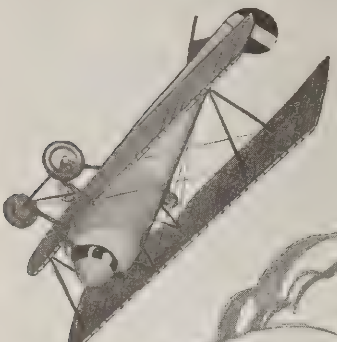

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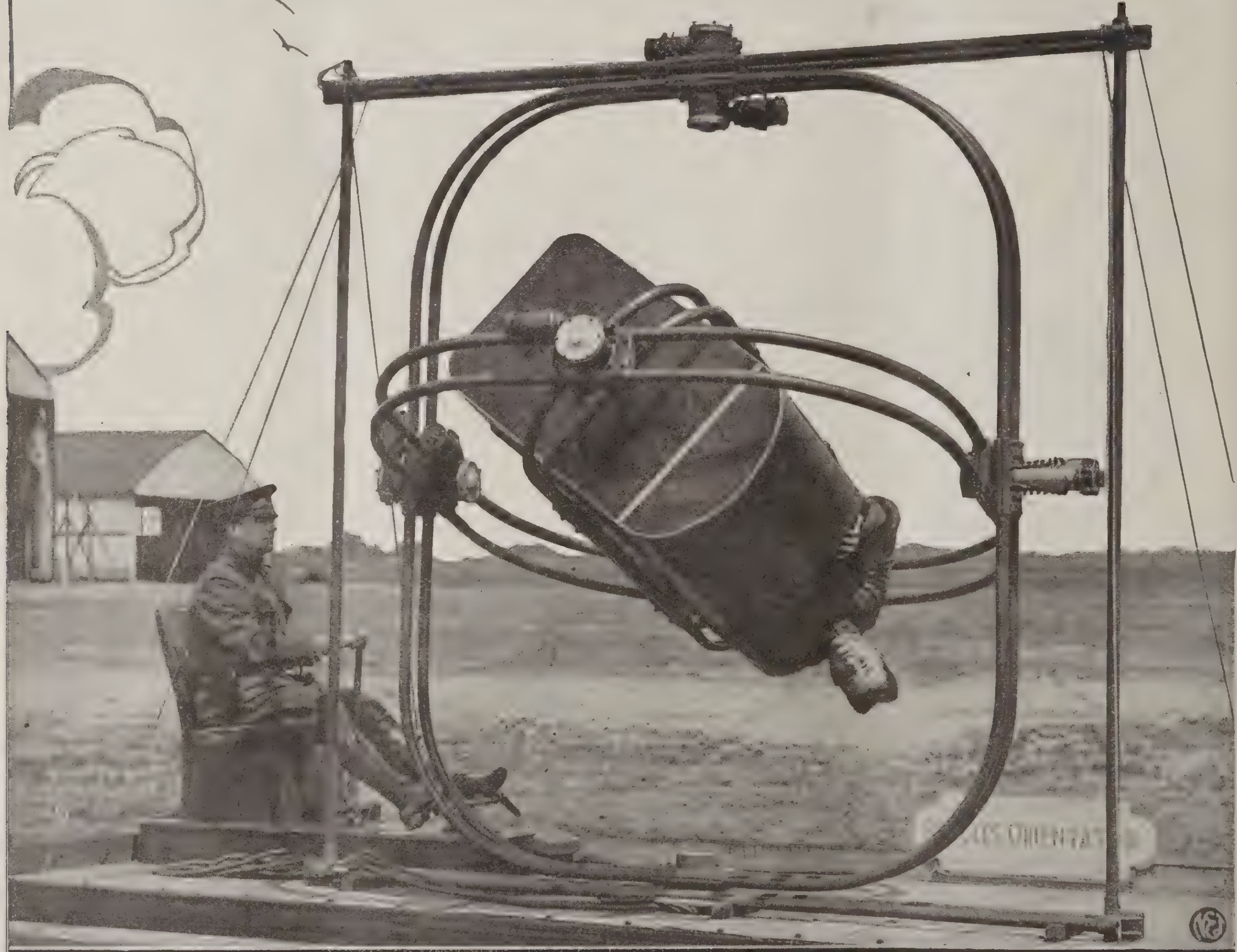

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COURTS ASKED FOR INJUNCTION TO HELP AERO CLUB MAINTAIN ITS NATIONAL LEADERSHIP

Helpful Court Action Will Insure Continuation of Aero Club's High Standard Which Has Made It a National Moral Force

TO assist the Aero Club of America in maintaining its national leadership and insure the continuation of its high standard which has made it a national moral force and at the same time bring to an end the unauthorized efforts of some individuals who sought to have the club enter into undesirable entangling alliances and assuming ruinous liabilities and obligations, Mr. Henry Woodhouse, who has been one of the most active members of the Club since 1911 and a member of the Board of Governors since 1914, has applied to the Supreme Court, State of New York, for an injunction. Major Glidden's affidavit, which presents the case in a most dignified and conservative manner, and has been presented to the Supreme Court in conformation with Mr. Woodhouse's action, reads as follows:

STATE OF NEW YORK, }
COUNTY OF NEW YORK } ss.:

CHARLES J. GLIDDEN being duly sworn deposes and says:

1. That your deponent is a member in good standing of the Board of Governors of the Aero Club of America, the respondent herein.

That your deponent became a charter member of said Aero Club of America in November, 1905, and was elected Vice-President that year and has taken an active part in the activities of the Club and has incurred considerable expenses and has contributed efforts and time during the past fifteen years to advance the cause of aeronautics as represented by the Aero Club of America and to assist the Club itself to attain a position of national and international importance such as it holds today.

2. That the said Aero Club of America is a membership corporation duly created, organized and existing under the laws of the State of New York, having its office and Club House at No. 297 Madison Avenue, Borough of Manhattan, City and State of New York.

3. That the said Aero Club of America, as a direct result of its being organized in 1905 and the pioneer activities started by a group of men of which deponent was one, and Messrs. Alan R. Hawley and Augustus Post were others, was accepted and acknowledged to be the national aero club of the United States and as such was, in the year 1906, admitted in the International Aeronautic Federation to represent the United States in said Federation, the rules and regulations of which govern all aeronautic sporting events throughout the world.

4. Substantially for the purpose of assisting said Aero Club of America in attaining national and international reputation for its activities deponent, together with his various associates, charter members and officers in the Aero Club of America, including Alan R. Hawley, Augustus Post, Major J. C. McCoy, Colonel Frank P. Lahm and Major A. B. Lambert, undertook to participate actively, at own expense, in aerial sporting activities and deponent, like the gentlemen heretofore referred to, mastered the science and art of piloting balloons which were the only practical aircraft available at that time and qualified for pilot's certificates, deponent receiving pilot certificate No. 12.

As a result of the pioneer efforts made by a small group of sportsmen and pioneers who were willing to take the risk and spend the moneys necessary to do the pioneer work of demonstrating the safety and the elements of safety existing in aeronautics, the Aero Club of America was enabled to make an entry in the International Contest for the International Balloon Trophy, which was competed for in Paris in 1906 and was won by the representatives of the Aero Club of America, which event brought international reputation and standing to the Aero Club of America as the national, active aeronautic club of the United States, and made possible such subsequent active work of international and national importance, which established the Aero Club of America firmly as the national aeronautic organization of the United States.

5. That deponent being duly impressed by the sportsmanship and high moral integrity and public spirited aims of the officials and members of the Aero Club of America as a whole, undertook and encouraged other Aero Clubs in the United States to affiliate with the Aero Club of America; and deponent also personally urged and proposed gentlemen to become members of the Club.

6. That when the deponent entered the United States Army as an officer at the United States Army Balloon School at Omaha, Neb., on June 12, 1917, and thereafter, for over two years while in the Army deponent believing explicitly in the patriotism, sportsmanship and high moral standard of the Aero Club of America and its officials, he availed himself of the Club's helpful assistance for the purpose of recruiting and in a general way for the upbuilding of the United States Army Air Forces; and, when deponent became Aeronautical Officer, North Eastern Department, Boston, Mass., and secured about two thousand applications for balloon pilots and aviators, and when he became President of the Aviation Examining Board, in charge of examining applicants from twelve states, for the Air Service and passed on the qualifications of about four thousand applicants for commissions as balloon pilots and aviators; and when, as Personnel Adjutant of the United States Army Balloon School at Omaha, Neb., he passed on four thousand candidates for various duties and for overseas work; and when he was appointed representative of the United States Army General Staff for seven states with headquarters at Atlanta, Ga.; and when after the signing of the Armistice, he was appointed in charge of recruiting several thousand men for the United States Air Service, with heaquarters at Washington, D. C.—that throughout the period of time deponent was in the service of the United States Army in the executive positions referred to, deponent found the Aero Club of America and its officials to be of utmost help and value to the Government. Accordingly, deponent recommended to many officers and gentlemen who wanted to become connected with a national aero-

nautic organization to become members of the Aero Club of America.

7. That deponent while serving as an officer of the United States Army had occasion to know and to become conclusively convinced of the entire sincerity of purpose, patriotic spirit, constructive aims and far-reaching influence for good of the work of the Aero Club of America, as conducted by its officers who had remained practically unchanged for many years and the result of their efforts and of the effect of their efforts could, therefore, be clearly seen and ascertained.

On or about the month of May, 1919, while deponent was still serving in the United States Army, he received a copy of the following resolution, which was presented to the Aero Club of America signed by over one hundred leading Aces and officers of the United States Air Service:

"WHEREAS, The Aero Club of America has, since its foundation in 1905, been the airman's best friend and is today the mainspring of the aeronautic movement in this country; and

"WHEREAS, Before the war American aeronautics was supported mainly by the Aero Club of America's activities; and

"WHEREAS, Before America's entry in the war, when the U. S. Army and Navy had less than thirty aviators, the Club, guided by its extraordinary foresight and splendid patriotism, undertook to train aviators and form aerial reserves, and through these efforts succeeded in training, at private expense, over three hundred aviators, some of whom went with the Lafayette Flying Corps, and the others were commissioned in the Army and Navy Reserves, which were authorized by Congress and organized by President Wilson, upon the recommendation and urgings of the Club, and were the first A. E. F. aviators to go overseas; and

"WHEREAS, The pioneer work of the Club in creating college aeronautic units and fostering interest in aerial preparedness in colleges and universities in 1915, 1916, 1917 and its helpful advice and guidance were directly responsible for bringing six thousand college men into the Air Service; and

"WHEREAS, Before and after America's entry into the war, the Club, by means of energetic national campaigns, was responsible for securing large appropriations for military and naval aeronautics and urged unfalteringly the adoption of adequate plans for aerial preparedness; and

"WHEREAS, The Club heartily supported the work of the Lafayette Escadrille and Flying Corps, which were organized and supervised by Major Edmund Gros and Lieut. Com. F. H. Allen and generously supported by Mr. W. K. Vanderbilt, all members of the Club; and

"WHEREAS, Through the generous offer to pay the salaries of flight surgeons, amounting to $23,000 in 1917, when there was no provision for same, the Club was of great help in establishing the Medical Section of the U. S. Army Air Service, which, when put in operation, resulted in saving the lives of hundreds of aviators; and

"WHEREAS, The Club organized a Foreign Service Committee in Paris, composed of prominent Americans, members of the Club, residents in Paris, whose high standing in France and personal knowldge of the country enabled them to be of great assistance to American aviators at the front and elsewhere and visited the American aeronautic centers in France, and established Club Houses and supplied them, as well as aero squadrons at the front, with magazines, books, athletic equipment, tobacco and other needs, which greatly added to the personal comfort and well-being of the aviators; and

"WHEREAS, The Club soon after America's entry into the war, when there were no American decorations to be awarded for distinguished service, created the Club's Medal of Honor and Merit and Diploma to be awarded for distinguished service, thereby being the first national American body to express in a tangible way the appreciation of the American Nation to those who fought at the front for civilization and humanity; and

"WHEREAS, It was the Club's efforts that kept the U. S. Army and Navy aviators flying pay from being abolished during the war; and

"WHEREAS, During the war the Club, with rare kindness and sympathy, comforted the parents of the aviators who lost their lives or met with accidents, and with great trouble found out and supplied information to parents regarding the whereabouts of their sons who were in the Air Service; and

"WHEREAS, The Club created the Airmen's Memorial Fund, for the purpose of erecting a suitable memorial to the airmen who have died and has taken other steps to honor and perpetuate the names of the airmen who fought and died for the cause of humanity and civilization; and

"WHEREAS, The employment of aircraft for general purposes has been advanced at least one year, because the Club, during the past five years, had the foresight to make plans for the employment of aircraft for transportation, sport, scientific and civil purposes; and

"WHEREAS, The Club contributed in many other ways not made public and not mentioned herewith to the upbuilding of our Air Forces and to attaining the final victory over Germany and her Allies and to the placing of American aeronautics on a sound, permanent basis; be it

"RESOLVED, That we, among the hundreds of others who have seen the great value and benefitted through the Club's inspiring patriotism, progressive work and liberal contributions, herewith express our heartfelt gratitude; and, be it further

"RESOLVED, That we hereby pledge our hearty support to the Club in its great work; and further

"RESOLVED, That a copy of these resolutions, duly engrossed, be transmitted to each and every member of the Board of Governors of the Club and the Chairman of the Committees and those members of the Club and co-operating organizations who have contributed to the Club's splendid work."

The deponent has occasion to verify the statements made by the officers who signed the above resolutions and found them to be true and also found that the Aero Club of America had been responsible for even a great many more creditable achievements than those given in the above resolutions.

8. That upon relinquishing his commission in the United States Army and being transferred to the United States Air Service, Reserve, with the commission of Major, the deponent was invited to give his active co-operation to, and take an active part in, the important work of the Aero Club of America to develop civilian aeronautics and aeronautic sport on a broad and extensive scale. Thereupon the deponent consulted his superior officers in the War Department and at their suggestion he conducted an investigation of the Aero Club of America's management and finances before accepting the invitation to participate actively in the affairs of the Aero Club.

From his investigation, the deponent found that the Club had been and was efficiently managed, that its activities were governed by a high moral and broad standard, the Club was financially on a self-supporting basis and had a treasury surplus amounting to approximately twenty thousand dollars; and the membership of the Club numbered approximately 2,700 members, over half of whom were shown on the records to be active or reserve U. S. Army and Navy aviators and airship and balloon pilots.

Thereupon the deponent accepted the invitation to participate actively in the Club's activities and, subsequently, also accepted the nomination tendered to him and was unanimously elected a member of the Board of Governors of the Aero Club of America at the annual elections in November, 1919.

9. In September, 1919, the deponent was invited, as a member of the Club, to attend the reception given to Commodore Louis D. Beaumont, which was held at the Aero Club of America Club House at No. 297 Madison Avenue, Borough of Manhattan, City and State of New York, in honor of and appreciation for the valuable assistance and patriotic work done on behalf of the Aero Club of America by Commodore Beaumont, who paid the expenses of establishing a Club House in Paris, in the name of the Aero Club of America, during the war, for the use of American Air Service Officers, and made a number of other similar large contributions to assist the Club in its patriotic work.

While attending this reception the deponent was told by Commodore Beaumont that he had been invited by the officials of the Aero Club of America to become Chairman of a Commission which would go around the world, in the name of the Aero Club of America and Aerial League of America, and would organize Committees and Aero Clubs in different countries and in other ways prepare for organizing an Aerial Derby Around the World; and at the same time gather data and information regarding the development of civilian aeronautics in different parts of the world which would assist the Aero Club of America, and affiliated and co-operating organizations in planning a number of international aeronautic contests. Commodore Beaumont stated that he would pay the expenses of the Commission's trip around the world and invited the deponent to join the Commission as its Executive Secretary.

The deponent accepted the invitation and started with the commission and with officials of the Aero Club of America, including Messrs. Alan R. Hawley, Henry Woodhouse and

Sidney B. Veit. The Commission left New York on October 10th, 1919, and visited and consulted with city, civic, commercial and aeronautic authorities of many cities and towns throughout the East, Middle West, Northwest and Pacific Coast states, including Albany, Rochester, Buffalo, Cleveland, Dayton, Cincinnati, Detroit, Chicago, St. Louis, Milwaukee, Minneapolis, St. Paul, Kansas City, Omaha, Denver, Portland, Tacoma, Seattle, San Diego, Sacramento, Los Angeles, Santa Barbara, San Francisco and a dozen other cities.

The Commission was received in all these cities with most enthusiastic and impressive receptions and found that the name and achievements of the Aero Club of America and its officials were well known everywhere and the cities deemed it an honor and privilege to have the Commission visit their cities.

The Commission sailed from San Francisco in the first week of November, 1919, on its trip around the world and visited Japan, China, Corea, the Philippines, the various European possessions in the Orient, the principal cities in India, Siam, and other colonial states and countries, and your deponent ended his trip around the world by arriving in New York in the early part of June, 1920, having travelled approximately thirty thousand miles in eight months and three days.

10. On arrival in different cities and different states, beginning with China, members of the Commission were troubled and mortified to receive from time to time reports emanating from certain individuals in New York City who persisted in reporting that the Aero Club of America was to go out of business and was being taken over by a newly formed organization named the American Flying Club; and that further misrepresentations of facts emanating from the same source stated that the Aero Club of America had only approximately three hundred members and was going out of existence, and Clubs in the United States affiliated with the Aero Club of America were becoming affiliated with the American Flying Club.

As the members of the Commission had found and were finding daily in every country which they visited, that the highest authorities were familiar with the important work being done by the Aero Club of America and extended to the Commission the highest honors and courtesies possible, it was most upsetting to read the reports against the Aero Club of America, which often contained slanderous accusations and statements regarding the membership and the activities of the Club which the deponent knew to be misrepresentations.

Some of the slanderous attacks and misrepresentations which came to the attention of the deponent are submitted herewith by the deponent as evidence.

The misrepresentations regarding the Aero Club of America printed in British and French publications which were signed by or quoted officers of the American Flying Club, submitted herewith as evidence, were insulting, slanderous and misleading in character and purpose and made the work of our Commission difficult and seriously embarrassed the members of the Commission.

11. Immediately upon arrival in New York the deponent conducted an investigation and found that there was no truth to the malicious reports and mis-statements which had been circulated and printed abroad regarding the Aero Club of America and its officers.

Upon investigation deponent also found that similar malicious and unfounded reports and communications had been circulated in the United States and that they had apparently emanated from the American Flying Club and members of the said Flying Club.

12. Having seen newspaper reports that there was under consideration an amalgamation between the American Flying Club and the Aero Club of America, deponent requested to be informed regarding the subject by officials of the Club, including Mr. Charles Jerome Edwards, the Acting President of the Aero Club of America, and was told by some of the officers that they did not know, that the rumor had arisen as the outcome of the publication in newspapers of false statements issued by unknown parties, following the meeting of the Board of Governors of the Aero Club of America of April 7th, 1920, at which there had been proposed an extensive movement and campaign to increase the membership of the Aero Club of America, following which the following resolution had been adopted:

"That the President appoint a committee of five to study the situation, draw up plans and submit their recommendations to the Board of Governors of the Club to bring into closer co-operation with the Aero Club of America all the aeronautic interests of America. This Committee to report to the Board of Governors within five weeks."

The deponent ascertained that this Committee had been appointed and was known as the "Co-operating Committee." He found that the members of the Committee, with the exception of Mr. Alan R. Hawley, had not been active in the affairs of the Club.

He found, further, that for unknown reasons the Chairman of said Committee had not notified Mr. Hawley of the meetings to be held by the Committee, and had conferred with officials of the American Flying Club and the Manufacturers Aircraft Associations, and had in other ways departed from the purpose assigned the committee when appointed and far exceeding the authority given to this Committee under the resolution already quoted.

13. The Deponent found evidence that the Chairman of the so-called "Co-operating Committee" was not familiar with the pernicious activities against the Aero Club of America perpetrated by officers and members of the American Flying Club quoted above and was, without authority, apparently negotiating for an amalgamation of the two clubs on terms ruinous to the Aero Club of America.

14. The Deponent found that a number of officers and members had asked for information regarding the proposed amalgamation and this information had been refused. He also found that other officers and members of the Club had misgivings about the matter and that warning had been given to the Board of Governors of the possible danger to the Club of such an amalgamation by Mr. Henry Woodhouse, an active member of the Board, who in a letter dated April 28th wrote to the Board of Governors as follows:

"The Board of Governors, April 28th, 1920.
Aero Club of America,
New York City.

Gentlemen:

"Owing to the request made by Congress to the Attorney General to prosecute certain aircraft interests the Aero Club of America is in a critical position where a false step will destroy it forever as a moral force.

"The Aeronautic Movement, the movement for aerial preparedness and aerial sport have been upheld, stabilized and advanced even in the most trying times by the moral force exerted by the Aero Club of America. This powerful institution which has meant so much to the country, emerged from the war with a stupendous record of services performed, with clean hands and unspotted integrity.

"By the published reports circulated by certain individuals and interests which have been accused of various crimes by Congress and are being investigated by the Attorney General, it is evident that these individuals are making efforts to become connected with the Aero Club of America for the purpose of using the Club as a shield, preventing the Club from helping the Government in the civil suits which Congress has requested the Attorney General to start against them, for the purpose of recovering funds illegally or fraudulently paid by the Government to said individuals and interests.

"The charges which both the House of Representatives and the Senate have made against these individuals and interests are very grave; and the efforts of these individuals in attempting to connect themselves with the Club during the past few weeks have been so artful, and their methods so unscrupulous, unethical and lacking in truthfulness and decency as to already place the Club in a compromising position, from which it can only extricate itself by prompt action in adopting and making known its policy regarding the present situation.

"The accompanying documents show that the individuals who are trying to become affiliated with the Aero Club of America are some of the individuals whom Congress accused for being responsible for some phases of the aircraft scandal and who are, at Congress' request, to be prosecuted by the Attorney General. The evidence before our Board of Governors is sufficiently conclusive to compel our Board to consider the situation and decide on an ethical policy before accepting the invitations made by the interests under discussion to consider "merging" of interests and admitting into the Club the group of individuals who are obviously trying to use the Club as a shield.

"The situation is as follows: Congress has investigated the aircraft scandal and has reported the existence of certain evils and has asked the Attorney General to prosecute the guilty parties. Fortunately the Club has kept out of all scandals and has emerged from the war with a splendid record. **Efforts have been made by the above individuals and interests to gain control of the Club, but they have been defeated and the Club has remained an independent, moral force, fit to lead the aeronautic movement.**

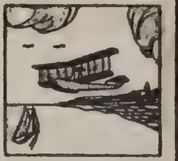
"But now it is proposed that the Club become affiliated with the very interests that are accused of being responsible for the scandals reported by Congress.

"The Board of Governors must, therefore, decide which of the following alternatives it wishes to adopt:

"1. Whether to join the prosecution and assist the At-

(*Continued on page* 688)

THE NEWS OF THE WEEK



View Yacht Races From Air

A number of aeroplanes and flying boats were chartered by people to witness the recent yacht races between the Shamrock IV, the British challenger, and Resolute, the American defender, for the cup.

The view of the race afforded from the air proved exceedingly popular and the demand was greater than the supply for accommodations.

Among the many aircraft which took flights over the course were two J. L. 6 all metal monoplanes, the Transoceanic Company's H-16, twin motor flying-boat, several DH-4-B, land aeroplanes of the Army from Mitchel Field, several small flying boats, and a Navy Blimp.

Plan Aeroplane Landing on Hotel Astor Roof in New York

Th first housetop landing for aeroplanes in New York City will be constructed on the roof of the Hotel Astor this summer, according to an announcement of the hotel, which says the plans are nearly completed.

The landing will be above the west end of the roof and will be 62 feet wide and 286 feet long.

In addition to the landing a special service for aeroplane guests will be provided. Passengers will register on the roof and receive their room keys.

Purchase Land for Aviation Field

Detroit.—The Aviation Country Club of Detroit has bought a large tract of land and started work on a $2,000,000 club plant.

The land purchased comprises 823 acres and two lakes, situated in Oakland County, about twenty miles north-west of Detroit.

Work on hangars designed to accommodate twenty planes is under way and landing fields are being laid out. One of the buildings has been converted into a clubhouse. Landing harbors for hydroaeroplanes on each of the lakes are included in the plans.

Competition flights are to be arranged with aero clubs in Cleveland, Boston, Chicago and New York.

The Advisory Board and Board of Directors include Capt. Eddie Rickenbacker, H. M. Leland, Col. Sidney Waldron, Col. J. G. Vincent, E Leroy Pelletier, John E. King, J. B. Duffield and E. J. Woodseonn.

Study Aeronautics at Culver Military Academy

Aeronautics is now on the curriculum of Culver Military Academy, Culver, Indiana, and the boys at this school may learn the art of flying as part of their regular school work. Culver realizes the important part aeroplanes will play in the commercial development of the country and feels that the younger generation should be given the opportunity to learn the most important aspects of aeronautics.

The aviation course is divided into two parts, the ground school course and the flying course. The ground school course includes instruction in gas engines, rigging, doping, theory of flight, aerial navigation and bombing. In the flying course thorough instruction is given in conservative flying. The student is instructed to take-off, fly a straight course, turn, glide, spiral, and land. The present equipment consists of two seaplanes, assembled and in operation, and five unassembled planes; also aeroplane motors of different types, blocked up for instruction in ground school work. A large steel hangar has been erected on the lake shore so that the seaplanes can be pushed into the water readily from shelter.

The instruction in actual flying is done from Lake Maxinkuckee. The type of plane used is that which the Navy uses for training. Two expert aviators who have had army and naval experience are in charge of the instruction work and a number of mechanics are employed to look after the upkeep of the planes.

The course in aviation was given for the first time this spring and is being continued this summer in connection with the Culver Summer Naval School.

State Police Plan Use of Aeroplanes

Plans for using aeroplanes in State Police work were discussed recently in Harrisburg, Pa., by State Police heads. Major W. E. Hair, deputy superintendent, made flights from Harrisburg to Lancaster with Lieutenant Mussellman. Experiments were started last week with wireless telephones between police stations.

The State Forestry Department is negotiating for use of aeroplanes to map certain forest areas. If not too expensive, the Legislature will be asked for appropriations for aeroplanes for emergency use.

Italian Arrives With Plans for Fast Plane

The plans of a biplane which is said to be the swiftest aeroplane in the world have been brought to this country by Lieut. Cesere Sabelli of the Italian Caccia Air Squadron, who arrived recently from Italy. The plane can make 280 kilometers, or about 173 miles, an hour, according to Lieut. Sabelli. He said that he would discuss the plans with members of the Aero Club, but would not make known the name of the plane for several days.

J. L. Planes View Yacht Races

Two of the Larsen all-metal monoplanes were conspicuous in the ranks of aircraft that hovered over the America's cup racers, July 15, off Sandy Hook, N. J., when the international yachting competition was resumed.

One of the JL-6's was equipped with pontoons, making an able seaplane of her. The other motored with the same engine that made the record non-stop Omaha-Lancaster (Pa.) flight recently, had no shift made in her ordinary landing gear.

That the men at the Larsen Flying Field, at Central Park, L. I., had complete confidence in the JL-6 was shown by their venturing 15 miles over the ocean in this "land" plane.

Each of the all-metal machines made two trips to the races. The pontoon-equipped plane first started from Amityville, L. I., with a cargo of photographers and Miss Esther Larsen. Bert Acosta was the pilot.

After seeing the early part of the race and snapping some photos, Pilot Acosta landed at New York's new airport, 83rd Street and North River. There he picked up Mr. Larsen and his guests who were: Capt. Edward Rickenbacker, E. B. Allynne, of Cleveland, and R. C. Kettering, of Dayton.

The other plane carried newspaper men and a movie photographer on both morning and afternoon trips.

Farman Plane Busy at Charlotte, N. C.

The Farman Tourabout aeroplane of the Southern Aeroplane Company of Charlotte, N. C., has been doing a great deal of flying.

H. R. Tucker, president of the company, states that since the middle of May this year over 400 passengers have been

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Fishing up-to-date. A Pony Blimp with two piscatorial enthusiasts making the most of it

carried to date. Flights have been made in all parts of North and South Carolina, and landings and take-offs even made on ploughed fields.

The Renault engine is giving excellent service and a total of over 70 hours has been flown with no trouble, although the grade of gasoline used at times was very poor.

U. S. Aerial Express Service to Start

The U. S. Aerial Express Co., which was formed early in the year to conduct an aerial transportation service between Detroit, Cleveland, Buffalo and Toronto, and which expected to have planes in operation about the first of May, has been delayed in carrying out their program through matters pertaining to the incorporation and organization of the company.

Arrangements have been concluded whereby Lieut. Thomas F. Dunn, who was responsible for the creation of the company, has purchased all assets and will put the planes into immediate service, with the initial route between Detroit and Cleveland.

The seaplanes that are being put into service are the largest and safest in the world for commercial aerial transportation. The necessary changes to adapt them for this work were made by the U. S. Navy, under the direction of Lieut. Dunn, and with the co-operation of the Navy engineers, who were the original designers of the planes. They have a seating capacity of twenty passengers in a handsomely appointed cabin fitted with wicker chairs, beside large Triplex safety glass windows which permit a wide range of vision. A compartment is provided for the carrying of mail, express or valuables with a capacity of one ton and which is lined with copper and asbestos for extra safety. In the rear is another compartment for baggage or express. The hulls are sheathed inside and out with three-ply veneer, and the space between them is filled with Kapok fiber, making the hull unsinkable. All fuel supplies are carried outside of the hull and the tanks are so arranged that in case of trouble or fire they can be dropped from the plane by the movement of a lever in the pilot's compartment. The planes are capable of rising from the water with a dead load of 6000 pounds.

Being seaplanes, their flying routes as laid out will always keep them within reach of water for landing. Their size is such that they will not be affected by water conditions on the great lakes. They are fitted with twin Liberty Motors, one of which will sustain the plane in the air.

The organization now handling the project comprises only men trained in Aeronautics. Lieut. Thos. F. Dunn is a pilot with extensive military and civilian flying experience. He is assisted by Lieut. Arthur H. Denison, formerly of the Air Service, U. S. A., with flying and Aeronautic Engineering training. The chief engineer, Mr. A. H. Hess, was an officer in the navy with flying, engineering and wireless experience. The pilots, assistant pilots and crew are all men who have had extensive training and long experience on seaplanes of the type used and are thoroughly familiar with them.

Christens Speed Boat, Miss Toronto

The launching of the hydroplane, Miss Toronto II, recently took place in Toronto, Canada. The boat, which is powered with a Liberty engine, was christened by Mrs. F. G. Ericson, wife of the designer and manufacturer of aeroplanes and also of the Miss Toronto II.

Mr. and Mrs. Howard K. Neal, who took their honeymoon trip by aeroplane over Texas

Take Aerial Honeymoon Over Texas

Another aerial honeymoon recently took place, this time the affair occurring in the South. Mr. Howard K. Neal, of the Inter-State Airplane Company of Dallas, Texas, flew from Houston, Texas to Dallas. Here he met his bride and they started out with no definite goal in view, except to have a honeymoon trip by aeroplane. They landed at Alvord, Bowie, Montague, Necoma, Wichita Falls and Seymour, Knox City, Vernon, and cruised over the Burkburnett Oil Fields. At Vernon, they were royally entertained at the Guy Wagoner and A. B. Wharton ranches; Mr. Guy Wagoner is also an aviation enthusiast, having a Curtiss Oriole and two Curtiss training aeroplanes of his own.

Mr. Neal used a Standard J-1, equipped with a Curtiss OX-5 engine. Both he and his wife were greatly pleased with their modern mode of honeymooning and they expect to make many more trips by air.

Houma, La., Aero Club Planned

Houma, Louisiana, after a series of demonstrations of the practicability and the commercial value of the aeroplane, has decided to get on the air map of the nation. Arrangements have been completed by the Association of Commerce to construct a first-class landing field here. Plans also have been inaugurated for the formation of an aero club.

The landing field will include the Terrebonne parish fair grounds and sixteen acres of land adjoining belonging to the city of Houma but dedicated by the city council during the past week as a landing field. Lieutenant P. L. Higgins and C. M. Peters of the New Orleans Aviation Company have had a Curtiss biplane in Houma for the past few weeks. They expect to spend considerable time in this section during the next year, using the Houma field as their headquarters.

Landing Field at Yreka, Cal.

Yreka, Cal.—Cady Field, one and a half miles south of Yreka, has been officially selected as a landing field for Forest Service fire patrol ships. An invitation has been extended to all aviators to use the field.

Carry Grapefruit in Seaplane From Florida to New York

Two HS2-L flying boats belonging to Aero Limited recently flew from Miami, Fla., in sixteen and a half hours flying time. Each of the machines carried one thousand pounds of grapefruit as cargo.

They were piloted by George Gay and George Cobb. Excellent flying conditions were encountered during the flight and the two boats were always in sight of each other. Stops were made at Charleston, S. C.; Moorehead City, N. C., and Ocean City, Md.

Aerial Service Between New York and Atlantic City

An air line between New York and Atlantic City was recently started. Flying boats for this service, are creating a large aerial travel trade which promises great things in the line of quick communication. A score or more newly arriving professional aviation companies have been carrying passengers from daylight until after dark and are establishing aerial taxi routes to other resorts on the coast.

Woman of 80 Years Flies in Aeroplane

Having predicted many years ago that she would live to see the day when she would ride through the air, Mrs. Annette Shroyer, 80 years of age, proved the truth of her statement recently when she took a flight in an aeroplane with Aviator Pierson at New Carlisle, near Springfield, Ohio. She was greatly pleased with her first aerial trip and is very enthusiastic to fly higher next time.

Miss Toronto II being christened by Mrs. F. G. Ericson. The boat was built by F. G. Ericson, of Toronto, and it is equipped with a Liberty motor

The AIRCRAFT TRADE REVIEW

Ohio Outdoor Aero Show a Success

Operated under the auspices of the Associated Aviation Clubs of Ohio, the First Outdoor Educational Aeronautical Show was held in Cleveland, July 2, 3, 4, 5, 6 and 7.

The attendance during this time totaled over 100,000. The slogan of the Show was to demonstrate the "Safety of Sane Flying." Through the co-operation of the Director of Air Service a recruiting drive was made with beneficial results.

The following Mayors of Ohio cities were brought from McCook Field, Dayton, to the field by the Martin transport, piloted by Lieut. Wade. G. Q. Morgan, Acting Mayor of Archbold; A. R. Vosper, Mayor of Crooksville; J. A. Sousley, Mayor of Ada; Herman Witter, Mayor of Canton; Wendell Keyser, Mayor of Crestline; Geo. W. McCluan, Mayor of Mingo Junction; F. A. Burkhardt, Mayor of Lima; Martin A. Jameson, Mayor of Lebanon; J. A. Scheip, Mayor of Tippecanoe City; B. L. Jauman, Mayor of Delphos.

Among well known aeronautical people who attended the show were Major Connelly, Alexander Klemin, Lt. Comm. P. N. L. Bellinger, Col. R. S. Hartz, Capt. E. A. Kelly, W. B. Wanamaker, President of the Akron Flying Club, T. E. Bennett, Secretary Aero Club of Dayton.

The following resolution was passed by the Mayors who flew to Cleveland on Saturday.

Resolution

The resolution passed by the visiting Mayors of Ohio reads in part as follows:

"We realize from actual experience in the air today that aviation is a quick, clean and convenient mode of transportation. We realize the need of landing fields in every municipality in Ohio, the birthplace of aviation.

Therefore, be it resolved, that the undersigned mayors of Ohio municipalities do urge that the executive heads of every city and town in Ohio provide and maintain municipal landing places in their localities and, be it further resolved, that a copy of this resolution be sent to all other municipalities in the state."

The meet was conducted under the auspices of the Ohio Aviation Commission recently appointed by Governor James M. Cox, and the educational value of the show was in demonstrating that proper ground organization, covering inspection of machines before and after flight and enforcing aerodrome rules, in co-operation with the pilots, goes a long way to eliminate 90 per cent. of the accidents.

Among the aircraft which visited the Show were the Goodyear pony blimp, piloted by Mr. H. T. Kraft, the Kaytee cabin cruiser from the Dayton-Wright Airplane Co., Dayton, piloted by Benny Whelan, and the "Honeymoon Express" and several DH-9's from McCook Field, Dayton.

The program comprised a double wedding in the air, formation flying, and an inter-city race.

Curtiss Buys Hazelhurst Flying Field

The Curtiss Aeroplane and Motor Corporation, of which John N. Willys is President, has purchased, according to the newspaper press, Hazelhurst Aviation Field from the Hempstead Plains Company. The Government formerly had a lease on the field and used it during the war as a training ground for aviators.

The field comprises 135 acres and the purchase included the hangars and buildings. The Curtiss Company will use the ground temporarily for experimental and manufacturing purposes. The Buffalo plant will be abandoned and Hazelhurst Field, which will be known as Curtiss Field, will be the main headquarters of the company.

Aero Service Between Los Angeles and San Francisco

The Aero Transportation Company of Los Angeles, Cal., has been operating the giant aeroplane "Avion" with much success, and a large number of flights from the field at Los Angeles to San Francisco have been made. Whole parties charter the plane for trips and much enthusiasm and interest has been aroused by the activities of this company. Luncheons are served while the machine is flying. Aviator Pond pilots the plane.

Among those who have taken a trip in the Avion is M. P. Snyder, mayor of Los Angeles, who was exceedingly delighted with his flight. He expressed a firm conviction that aerial transportation is an established fact.

Hurst Company to Build Plant

Bids for a factory site on the aviation field are being received by E. H. Snyder, vice-president of the Hurst Aircraft Manufacturing Company, of Evansville, Indiana.

The company has been perfecting a three-passenger aeroplane which will be economical and durable. The plane will be made with folding wings, will fit in any ordinary garage.

A service station will be established in connection with the factory, where flying tourists may stop for oil, gasoline and repairs.

The Evansville Aero Club membership is planning a club house on or near the aviation field. It is the plan of the Aero Club members to build the club quarters after the manner of a country club.

Officers of the Hurst Aeroplane Company are M. V. Yeager, Sullivan, Ind., president; E. H. Snyder, vice-president; E. H. Hyman, secretary; Paul Schmidt, treasurer; A. W. Foster, Robert Knight and C. H. Moss, directors. Alexander Klemin is consulting engineer for the company.

Aviators R. C. Marshall and Frank Palmer, who recently flew from Daytona, Fla., to Dayton, Ohio

Plan New Aerial Line in Oregon

Klamath Falls, Ore.—Aeroplane services from Klamath Falls to Crater Lake and other southern Oregon points are planned by the O. K. Jeffry Company of Portland, according to announcement by J. Fellows and N. B. Evans, who are promoting the project.

In the Crater Lake service a hydroaeroplane would be used, the landing being made at Klamath Falls on Lake Ewauna and on famed Crater Lake at the other end.

Hangar Bids Asked for Twin Cities

Bids for building a new hangar at the Twin City Municipal Flying Field, formerly the Speedway, will be asked of Minneapolis and St. Paul concerns.

Plans for the hangar to cost approximately $16,000 were approved recently by the Twin City Aerial Corporation, at a meeting of the Civic and Commerce Association.

Aerial service between Minneapolis and Chicago has been assured with the building of the new hangar.

Georgia Aviation Gets Recognition

Atlanta, Ga.—Aviation in Georgia is given a recognized standing by a bill introduced in the Georgia State Senate. It defines aeronautic terms and license pilots. Registration fees are fixed at $5 a year for each airship; for examination of applicants for pilot licenses, $25; for pilot licenses, $2, and for duplicate copies of licenses, 50 cents each.

It provides for issuing of license numbers as for automobiles, and requires the number to be displayed on all aeroplanes in figures not less than three feet high.

In the Lower House, Price Gilbert's plan to regulate airship traffic in Georgia was incorporated in a bill introduced by Mr. Neill of Muscogee. The bill provides for the registration of all airships, a licensing of pilots, plates and license tags for airships, a definition of legal terms relative to airships and conditions which must be met by non-resident pilots who seek to operate airships in Georgia. It is the first bill of this nature introduced at this session.

PRELIMINARY REPORT ON FREE FLIGHT TESTS

BY EDWARD P. WARNER AND F. H. NORTON

(Report No. 70, National Advisory Committee for Aeronautics)

(*Continued from page* 657)

Longitudinal Balance

The factor on which the longitudinal balance of an aeroplane primarily depends, and to any variation in which it is always highly sensitive, is the position of the center of gravity of the machine. The first step, then, in any study of balance and of the action of the controls is to determine as accurately as possible the position of the C. G. with regard both to its vertical and its horizontal co-ordinates.

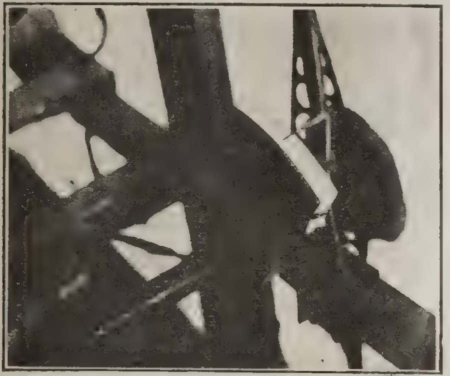

Fig. 23. Elevator Angle Indicator

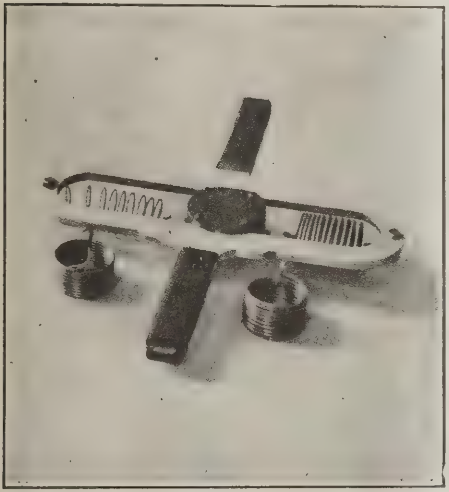

Fig. 24. Elevator Force Indicator

The method used in finding the location of the center of gravity was the usual one of weighing the machine on three pairs of scales, one under each wheel and one under the tail skid, first with the tail skid and wheels on the same level and then with the tail raised. The tail can be raised enough, without overbalancing the machine, to rotate it through an angle of about 15° when the pilot and observer are on board and through 10° when the seats are empty. From the weights thus obtained the center of gravity can be computed with a probable error of less than 0.01 foot in the horizontal co-ordinate and less than 0.03 foot in the vertical.

With a pilot weighing 125 pounds in the front seat and a 165-pound observer in the rear (this being the crew with which most of the tests were conducted), the center of gravity of No. 1 was 1.04 feet behind the leading edge of the lower wing, 2.50 feet behind the leading edge of the upper wing, and 0.28 foot above the thrust line, the axes of reference being taken parallel and perpendicular to the top longeron. The center of gravity of No. 2 was 0.99 foot behind the leading edge of the lower wing, 2.44 feet behind the leading edge of the upper wing, and 0.2 foot above the thrust line. The observer in No. 2 weighed only 125 pounds. If the mean chord be taken as 60 per cent of the way from the lower to the upper chord to allow for the larger area and larger unit lift of the upper wing, the line through the C. G. and perpendicular to the wing chords cuts this mean chord at 39 per cent of its length from its leading edge on No. 1 and 35 per cent on No. 2. This is materially farther back on the wings than the usual location for the C. G.

Since the balance depends on moments about the C. G., a small change of force on the tail planes, acting as it does at a large moment arm, has an important effect, and the angle of the stabilizer is therefore of primary importance. As already noted in the general descriptions of the machines, the stabilizer is supposed to lie flat on the upper longerons. Although the stabilizers were warped the mean chord of the surface was parallel to the top longerons within 0°.2 on both machines.

In order to determine the angle at which the elevator was set at any instant, a sector carrying a scale was fixed to the elevator rocker-arm shaft in the rear cockpit of No. 1, and this sector moved under a pointer fixed to the seat rail. No means of measuring the control position were provided on No. 2, as the arrangement of the elevator-control linkage was different on the two machines, and an entirely new and somewhat more complicated device would have had to be designed. The elevator control wires were adjusted somewhat more tightly than is usual in order to prevent any backlash. The elevator position indicator is shown in position in figure 23.

The force applied to the stick was measured by the instrument illustrated in figure 24. The knob which normally caps the stick was removed, and the slide held between two springs was slipped over the head of the tube. The pilot read the forces directly from the scale. The force indicator was originally fitted with two springs of equal strength, but, as it was found that the force was practically always in one direction, the springs shown in the cut were substituted.

The elevator positions for a variety of air speeds and engine speeds are given by the curves of figure 25. These curves were obtained in the same way as were the points on the slip-stream curve (fig. 22), each one relating to a fixed throttle setting. A fixed throttle setting, rather than a fixed engine power or number of revolutions per minute, is the criterion to which longitudinal balance and stability should be related.

Indicated air-speed (with the speed course correction made) is used directly as the basis for plotting the curves, and variations of air density during the test are entirely neglected. The elevator angles and forces depend primarily on indicated air-speed, since the angle of attack and the flow of air about the machine are functions only of the indicated air-speed and the slope of the flight path. The air density affects the controls in two ways, but both are of minor importance. In the first place, the slope of the flight path for a given throttle setting and indicated air-speed varies with the air density. This factor is insignificant. Secondly, the velocity of the slip stream and its effect on the controls depend on the true speed and so on the density. This effect, although it is of greater magnitude than the one first mentioned, can safely be neglected except for the large changes of destiny experienced in mounting to great altitudes. All the tests described here were carried out at between 1,500 and 4,000 feet.

Curve No. 1 relates to flight with wide-open throttle, No. 5 to gliding descent with the engine throttled down to idling speed. The elevator angle is referred to the top longerons as a datum line, and is taken as positive when the trailing edge of the elevator is pulled down. It will be observed that the curves all have the same general form, and that the positive angle of elevator setting for equilibrium at any given speed decreases progressively as the engine speed decreases. This is due to stream velocity, as might be desired. The readings secured in this way are, of course, not highly accurate, as the slip-stream velocity includes a considerable tangential

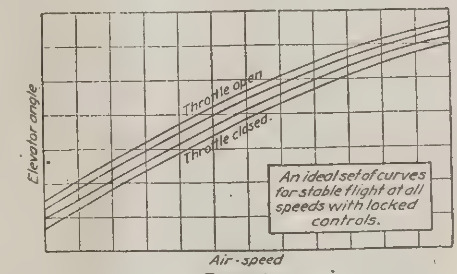

FIGURE 26.

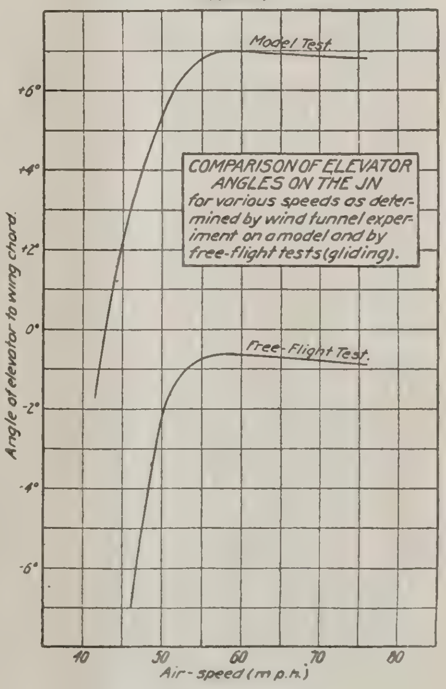

FIGURE 27.

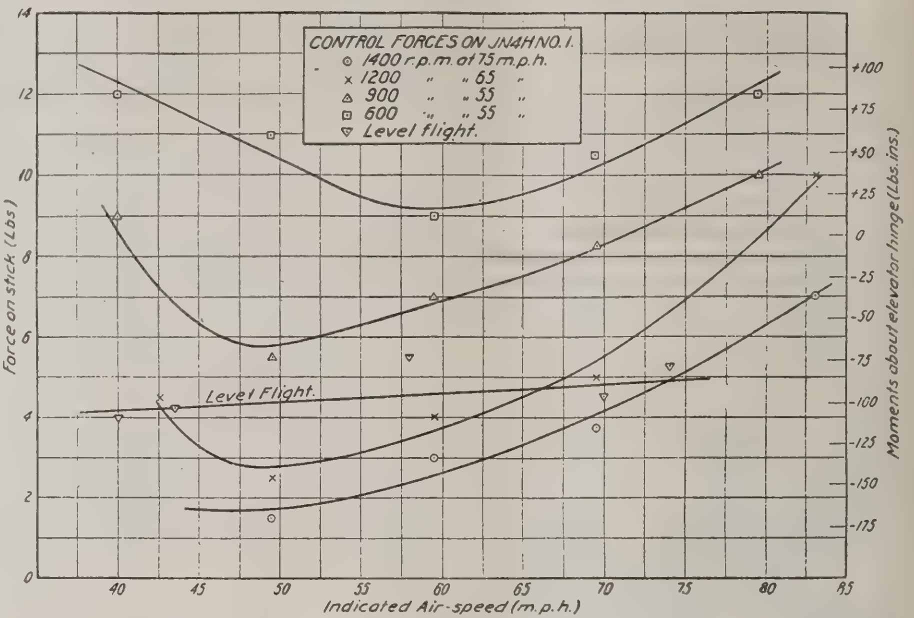

FIGURE 28.

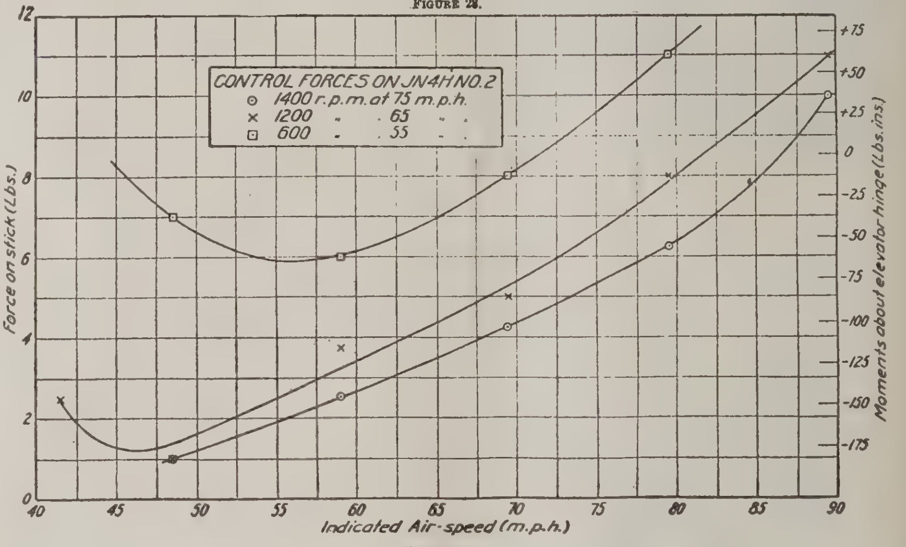

FIGURE 29.

the slip-stream effect on the stabilizer and to the location of the center of gravity above the thrust line, both of these things tending to cause the aeroplane to nose down to a smaller angle of incidence as the throttle is closed and therefore requiring that the elevator be pulled up in order to maintain the same angle of attack and the same air-speed. Translated into practical terms, this means that, if the stick were locked in position while the machine was climbing with open throttle, so that the elevator setting could not change, whatever might be the forces acting on the control surface, and the throttle were then closed the nose of the aeroplane would drop, and would continue to go down at least until the speed of the dive reached 90 miles per hour, and probably until the aeroplane passed the vertical and attained an up-side-down position. It is, of course, desirable that the nose should drop when the engine is throttled or cut off completely rather than that the machine should stall, but it is also desirable that the nosing down process should stop at a determinate point instead of continuing indefinitely. An aeroplane ideally balanced and ideally stable would continue at some speed within its normal range and at a normal inclination of path, with the longitudinal control locked whatever might be done to the throttle. The condition of locked control, of course, is only one of several which may occur. Others, even more important, will be discussed later in this section.

It is characteristic of the curves of figure 25 that they have a maximum point, and that their slopes at high and low air-speeds are accordingly of opposite sign. The effect of this change of slope can best be illustrated by two concrete examples. If an aeroplane is flying with the throttle setting corresponding to curve No. 3, and at a speed of 65 miles per hour, and if the stick is then suddenly pushed forward by an amount sufficient to increase the elevator angle by 0°.2 and locked in this new position, the primary effect will be to nose the aeroplane down, decreasing the angle of incidence and increasing the speed, since the pulling down of the elevator sets up an unbalanced upward force on the tail, and this gives rise to a diving moment about the center of gravity. By the time the speed has increased to 80 miles per hour the proper elevator setting for equilibrium is 0°.7, but the surface is locked at 1°.2. There is, therefore, still an unbalanced diving moment, larger now than before, and the speed continues to increase with a constantly steepening path. Manifestly this is an unstable condition, and it may be dangerous if the pilot is not vigilant. Suppose, on the other hand, that the initial speed was 50 miles per hour, this being less than that corresponding to the maximum elevator angle, and that the elevator was pulled down 0.2° and locked as before. The first effect, just as in the other case, is to decrease the angle of incidence and increase the speed. By the time the speed has increased about 1 mile per hour, however, a point is reached where the machine is in equilibrium with the new elevator setting, and it will then continue in steady flight at this slightly higher speeds. Gusts which change the angle of attack of the aeroplane have just the same effect as a sudden change in the angle of the elevator. If an aeroplane which is flying with the control locked at a speed corresponding to the negatively sloping portion of the elevator position curve is struck by a gust which decreases its angle of attack the angle will continue to decrease without limit. If the speed is low enough to lie on the positively sloping portion of the curve the aeroplane will return to its original speed and angle of trim as soon as the effect of the gust has passed. A positive slope therefore makes for longitudinal stability. It will be noted that the range of speed for stable flight with fixed controls and fixed throttle setting becomes wider in general as the engine speed is decreased, and that, for the lowest curve (engine idling), there is no sharp negative slope at any point. With the throttle wide open, on the other hand, the machine is unstable for practically the whole speed range.

An ideal set of elevator position curves would have a small positive slope at all points, and the curves for different throttle settings would be parallel and close together. Such a set is shown in figure 26 for comparison with the actual curves of figure 25. It is not desirable to have the positive slope very large at any point, as a machine characterized by such curves is difficult to control quickly, requiring the application of a larger force, and the moving of the stick through a longer arc, than is desirable to change the angle of attack. The stability with fixed controls can always be controlled by movement of the center of gravity, the stability being greatest when the C. G. is farthest forward with respect to the wings.

The sudden reversal of the slopes of the curves in figure 25, and the rapidity with which the elevator setting changes at low speeds, are due to the change of the center of pressure travel on the wings. This travel becomes less unstable as the angle increases and the effect, when combined with the movements due to the tail, is to give to the whole machine a high degree of statical longitudinal stability at low speeds.

At all speeds ordinarily used the elevator angle decreases as the angle of attack decreases, so that it is necessary to hold the stick farther back to fly at high than at moderate speed. Of course, it is not possible to go directly from one condition to the other, as, for instance, to decrease the angle of attack by pulling the stick back while flying in equilibrium at a moderate speed. The effect in that case would be the opposite of the one desired, and it is necessary when the angle is to be decreased, first to push the stick forward, nosing the machine down until the desired angle is reached, and then to pull it a little farther back than its original position in order to keep the machine in the attitude thus assumed.

For the sake of comparison the curve of elevator angles for a JN2 has been computed from tests made at the wind tunnel of the Massachusetts Institute of Technology[1] and is given in figure 27, together with a reproduction of the curve for the JN4H with the engine idling. In computing the curve for the model the center of gravity was assumed to be in the same position with regard to the mean chord of the wings as in JN4H No. 1. The differences between the JN2 and the JN4H are not of a nature which would be expected materially to affect the balance and stability, except that the stabilizer on the former is set at —3° to the wing chord, while that on the latter is at —2°.3. This accounts for a part, but only a part, of the relative displacement of the two curves. It will be noted that the model test would have led to a prediction of tail-heaviness, the opposite of the condition existing. This difference can be attributed to the fact that the tail of the model was made up as a flat plate cut from sheet metal, and the difference between inclinations of the zero lift lines of the stabilizers in the model and the full-sized machine was therefore much greater than was the difference in the settings of their chords. The large error in balance resulting from this error in tail construction points again to the necessity of minute accuracy in constructing the sustaining and control surfaces of wind tunnel models.

The two curves of figure 27 are of almost exactly the same form, and it appears probable that, were it not for the error noted above, they would be close enough together so that the balance of the aeroplane and the control position in gliding flight, when there is no slipstream effect, could be closely predicted from the model test. The present experiments and others of a similar nature on many different types of machines will provide the necessary data for correcting the wind tunnel results for slipstream effect and so for predicting the balance of an aeroplane at full power before it is built.

The discussion so far has been confined to the case of stability with locked controls. This, of course, is rather an uncommon case at present, as very few machines, especially of nonmilitary type, are fitted with means for locking the stick in position. The provision of a device for this purpose is highly desirable from some standpoints, and may become the usual thing at some future date, but there are other cases which, as already noted, are of more importance at present.

If the elevator is left free and uncontrolled it will take up a position in which there is a small moment about the elevator hinge, due to the air forces acting on the surface, tending to decrease the angle. This corresponds to an upward force on the elevator and is required to balance the weight of the member, which produces a moment tending to increase the angle of setting. In the machines used in these tests a force of 8½ pounds at the top of the stick, corresponding to a moment about the elevator hinge of 206 pound-inches, was required to hold the "flippers" up in the neutral position. A force of 1 pound at the upper end of the stick balances a moment of 24.2 pound-inches about the elevator hinge. In plotting the results of the tests the force on the stick and the moment about the elevator hinge have both been plotted as ordinates against air-speed. Since the ratio between the forces and the moments is fixed a single curve suffices for both by a proper adjustment of scales.

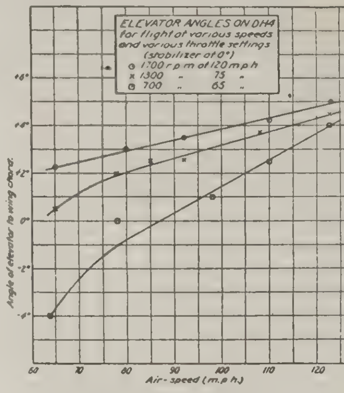

FIGURE 30.

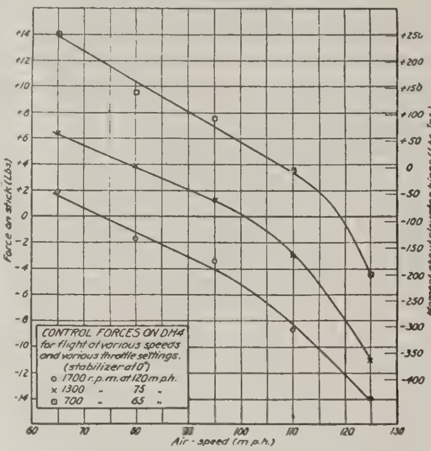

FIGURE 31

Before discussing in detail the curves of control force, a digression on the definition of nose heaviness and tail heaviness is appropriate, as these terms constantly enter into any question of longitudinal balance. An aeroplane may be, and has been, defined as in perfect balance (neither nose heavy nor tail heavy) either (*a*) when the pilot does not need to apply any force to the stick to keep the machine in equilibrium under the particular conditions in question, (*b*) when there is no moment about the elevator hinge, or (*c*) when the aeroplane flies in equilibrium with the elevator forming a prolongation of the stabilizer. The first of these definitions is generally the most satisfactory, and will be used here, as it relates to what the pilot is primarily interested in, the muscular force required to fly the machine steadily. Its only important disadvantage is that it makes too much depend on the weight of the elevators, a very minor and easily changed factor of design, to be really desirable from a scientific point of view. The second of the three definitions suggested would be better from this standpoint.

The curves of force and moment on the elevators of No. 1 for various throttle settings are given in figure 28, those for No. 2 in figure 29. The positive sign corresponds to a pull on the stick, holding the elevator up against a downward force. The curve marked "level flight" gives the forces for that condition with both air speed and throttle setting varing. In all cases the force is a pull on the stick, or, in other words, the aeroplane is nose heavy. This nose heaviness could be remedied, at least for any particular speed, or reduced to any desired extent by changing the stabilizer setting, or, what amounts to the same thing, by rigging the wings at a larger angle of incidence. If the stick on either one of the machines used in these tests is released, it will move forward from the equilibrium position and the machine will go into a dive with the throttle wide open. Releasing the stick during gliding descent also throws the aeroplane into a dive, the speed and steepness of which rapidly increase, apparently without limit.

With free controls, just as with the controls locked, stability is indicated by the slope of a curve, but it is the curve of control forces in this case instead of that of control positions. When the slope of the curve of forces is negative, as it is at low speeds in figures 28 and 29, the machine is stable with free controls, provided that the line of zero force on the stick intersects the curve of forces, as any change of speed would set up moments which would cause the elevators to move in the proper direction to restore the machine to its original attitude. When, on the other hand, the slope is positive the equilibrium is unstable and can only be restored, once it is upset, by the intervention of the pilot. It is evident from the curves that with free controls, just as with the controls locked, the statical longitudinal stability is greatest at low speeds of flight, that the machine becomes unstable at speeds in the neighborhood of the maximum attainable, and that the stability is greater in gliding than with the throttle open. The chief difference between statical stability with locked and free controls is that equilibrium can be established at any speed in the former case by locking the controls in the proper position, while there is only one possible speed of flight and angle of attack with free controls (for a given weight of elevator). The stability with free controls is therefore sufficient

FIGURE 15.

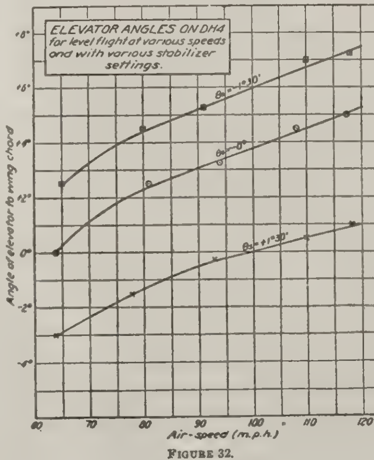

FIGURE 32.

FIGURE 16.

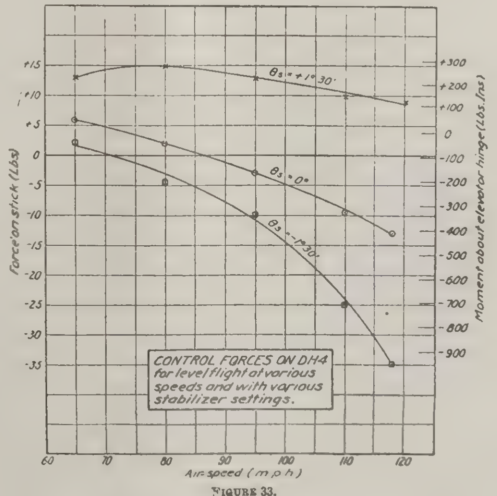

FIGURE 33.

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[1] Bulletin Airplane Engineering Dept., U. S. A., June, 1918, p. 89.

if the curve of forces cuts the line of zero force at one and only one point, the force being negative at all speeds higher than that corresponding to the point of equilibrium defined by the intersection of this curve and axis, positive at all speeds lower. It therefore does not matter if there are one or more "kinks," involving changes in the sign of the slope, in the force curve, provided only that they do not reach or cross the axis. For completely satisfactory stability with locked controls, however, the slope of the curve must be positive at every point throughout the range of speeds likely to be reached.

As has been pointed out, the machines used in these tests were nose heavy under practically all conditions, but this can easily be corrected, if desired, by setting the stabilizer at a larger negative angle relative to the wings. If greater stability or stability over a wider range of speeds is required it can be secured by moving the center of gravity forward, just as in the case of fixed controls. The natural tendency, when a machine is nose heavy, is to seek to cure it by moving the center of gravity farther back. Where, however, as in this case, the nose heaviness is accompanied by instability, moving the C. G. aft will only serve to aggravate the latter difficulty. If the C. G. is moved at all it should be moved forward. Changing the stabilizer setting so as to give an increased downward force on the tail, on the other hand, improves the balance and, as will be shown later, also has some beneficial effect on the stability with free controls. The exact effect of changing the stabilizer setting is difficult to predict unless an exhaustive series of tests on pressure distribution over the elevator is available (such tests have never been made except for one machine), as the moment about the elevator hinge depends largely on the position of the center of pressure on the elevator, and this is a very uncertain quantity. If the center of pressure position is assumed to be unaffected by the changes in elevator angle to secure equilibrium at a given speed with a changed stabilizer setting, the alteration in moment about the hinge, due to the different stabilizer angle, is almost exactly proportional to the square of the speed, as the change in elevator angle for equilibrium is very nearly the same for all speeds. The slope of the curve of forces on the stick, under these conditions, would decrease in algebraic value if the stabilizer angle were decreased, and the tendency would be toward stability. From this the deduction can be drawn that stability with free controls cannot be obtained at any given speed merely by changing the stabilizer setting unless the machine was originally nose heavy at the designated speed and all lower speeds of flight. Furthermore, an aeroplane the curve for which is unstable (i. e., has a positive slope) throughout the range of normal speeds of flight cannot be made stable with free controls at any speed whatever by changing the stabilizer setting unless it is initially nose heavy at all points of its speed range. Although these deductions are based on an assumption not strictly true, they check well with experiment and furnish a fair basis for reasoning. It follows from the foregoing conclusions that the maximum positive angle to which an adjustable stabilizer can be moved should depend on the behavior of the machine in a steep descent with the throttle open. For stability, the force on the stick under those conditions should always be a push. When it becomes a pull it is a sign that the stabilizer angle is too large.

If the conditions laid down in the last paragraph are not observed it will, as already noted, be impossible to secure stability with the stabilizer alone, and the center of gravity will have to be moved forward.

It will be noticed that the curves of control force for the two aeroplanes in gliding are nearly identical, while the negative moments about the hinge with throttle open are considerably larger for No. 1 than for No. 2. This difference is at least partially due to the difference in the vertical coordinates of the center of gravity, the C. G. of No. 1 being higher than that of No. 2 because of the reserve tank in the upper wing. The center of gravity being farther above the thrust line in No. 1, the thrust on that machine produces a stalling moment about the C. G., and this has the effect of making the machine less nose heavy than it would otherwise be.

It is desirable that the pilot of an aeroplane should be able to release the controls at any time without causing the machine to go into a steep dive or to stall badly. In order to fulfill this requirement the center of gravity should be materially farther forward with respect to the wings than it was in the particular aeroplanes which were the subjects of these tests, and the stabilizer should be set at such an angle to the wings that the machine will be in equilibrium with the controls free and the engine throttled at a speed well within its normal range (60 miles per hour would be a good figure for an aeroplane of the type and performance of the JN4H). Exact recommendations as to the position of the C. G. cannot be made without further tests, but it is probable that 28 per cent of the way back from the leading edge on the mean chord of the wings will be found a satisfactory location. The negative angle of the stabilizer with respect to the wings should be larger in these machines than in those in which the stabilizer section is symmetrical about a horizontal plane. A stabilizer with a flat lower and a cambered upper surface, such as that on the JN4H, has its zero lift line at an angle of from 2° to 4° to its chord, and it is the zero lift line which should be considered in choosing the setting.

In order to put to the test these theories as to the cause and cure of instability and poor balance, aeroplane No. 1 was rerigged with the stagger reduced by 3 inches, and with the rear of the stabilizer blocked up so that its chord was at a negative angle of 1°.6 to the top longerons, or 4° to the wings. The reduction of the stagger by moving the upper wing backward has practically the same effect as has moving the center of gravity forward.

Although the tests with this new arrangement have not as yet been carried far enough to make it possible to plot a set of curves, it was very apparent that the nose heaviness of the machine was much diminished and that the stability, both with free and fixed controls, was improved. The machine was still unstable at high speeds, but much less so than before. It was dived to a speed of 115 miles per hour with the throttle half closed, and the pull on the stick at this speed was only 10 pounds. There was no difficulty in taking off or landing, and the performance of the machine was not modified in any other respect. It is believed, as a result of these tests, that it will be found possible by further changes of the same nature to secure complete statical stability of the JN4H at all speeds without incurring any counterbalancing disadvantages.

Longitudinal Balance of the De Haviland

In order to have data on another aeroplane for purposes of comparison, and also to secure definite information on the effect of an adjustable stabilizer, the experiments which have been described above were repeated on the De Haviland 4 with Liberty engine. The method pursued in the first series of tests on this machine was identical with that already described, and the curves of control position, force, and moment for various throttle settings are given in figures 30 and 31. The force required at the top of the stick to balance the weight of the elevator was 3¾ pounds, and a force of 1 pound on the stick corresponded to a moment of 24.6 pound-inches about the elevator hinge. The "gearing" of the control was therefore practically identical with that in the JN. The scale of abscissæ may not be strictly accurate, as the air-speed meter on this machine was never calibrated on the speed course, but it probably would not be in error by more than three or four miles an hour at any point.

It appears from these curves that the DH4 possesses statical longitudinal stability both with fixed controls and with free controls, and that the trimming speed for any given condition increases as the engine speed decreases. If, for example, the elevator is locked at +3° with the throttle open the machine will fly at 82 miles per hour, and will automatically return to that speed if any disturbance causes a momentary deviation from it. If the engine is then throttled down to the idling condition, leaving the control still locked at +3°, the nose will drop and the steepness of the flight path will increase until the speed of 114 miles per hour is attained. The aeroplane will then continue to descend steadily at this speed on a flight path of constant slope. There will be no tendency, as in the other aeroplanes which have been discussed, to dive more and more steeply without limit.

Much the same statements can be applied to flight with free controls, except that in this case there is only one trimming speed for a given stabilizer angle and throttle setting. Here, again, the trimming speed increases as the throttle is closed.

It is obvious that the aeroplane of the future must have a high degree of inherent stability, so that it can be flown "hands off" for considerable periods in calm air. Since it is not desirable that the machine be limited to a single air speed for a given throttle setting, some means must be provided for changing the trimming speed. This can be done either by a device for locking the controls in any desired position or by making it possible for the pilot to adjust the stabilizer angle while in flight. The first of these alternatives has the advantage that it is easy and quick to operate, as the stick can be made with a lock instantaneously operable by the pressure of a finger. The locking should apply only to the fore-and-aft motion, the stick being left free to move from side to side in order that the pilot may correct disturbances of transverse equilibrium without releasing the lock, and, also, so that the ailerons may be free to move when struck by gusts, so giving a certain degree of "automatic warp." If an adjustable stabilizer is provided, it takes longer to change the angle for a new trimming speed than it does to move the stick and lock it in a new position.

NOTES ON THE THEORY OF THE ACCELEROMETER

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THE accelerometers which have been proposed for use on aeroplanes fall into two classes. The first class, represented by the R. A. E. instrument and the one on which the staff of the National Advisory Committee is now working, has a single deflecting member. This deflecting member is a semi-circular glass fiber in the R.A.E. accelerometer, a flat steel spring in the Advisory Committee's. The second class, the only representative of which among aeroplane accelerometers is the one designed by Dr. Zahm, has a number of plungers held up against stops by springs of varying strength or by springs of the same strength and loaded with varying weights. Increasing acceleration causes the springs to leave their stops, one after another, and to make contact with a sheet of paper which moves below them with a normal clearance of only a few thousandths of an inch. The springs in the Zahm instrument are helical, but they might be flat without changing the operation of the instrument. An accelerometer of this kind has the advantage of a very quick response to shocks of brief duration, but it makes a discontinuous record, giving indication only of the values between which the acceleration lay at any given instant. If there are enough springs a close approximation to the curve of acceleration can be secured, but this is essentially inferior to an instrument giving a continuous record directly if any satisfactory results can be secured from such an instrument.

The best way of approaching the theory of the accelerometer is to discuss first the obvious inherent errors and the means for reducing them to a minimum and then to take up the equations of motion and deduce from them the lag in responding to shocks, the damping of the sensitive member, and the possible errors due to resonance with the vibrations of the aeroplane engine.

Flat spring accelerometers of either the first or the second class are subject to errors arising from accelerations along the axis of the spring superimposed on those which it is intended to measure at right angles to the axis and from angular accelerations of the aeroplane. Furthermore, all accelerometers are effected and give inaccurate readings if they are not placed exactly at the center of gravity of the aeroplane (assuming that it is the acceleration of the center of gravity which is wanted and not, for special reason, that of some other part of the machine). The errors from this cause, in turn, may be divided into two groups. First, if the instrument is placed in a plane passing through the center of gravity and perpendicular to the axis along which the acceleration is to be measured, but not at the center of gravity itself, any angular acceleration of the aeroplane will correspond to a linear acceleration of the accelerometer spring and will be recorded as such. Second, if the accelerometer lies on the axis of measurement any angular velocity about either of the other axes will produce a centripetal acceleration which will be recorded by the instrument.

Taking up these sources of error in the order in which they were first mentioned, the first is the effect of linear accelerations along the axis of the spring. In treating this it will be assumed, to start with, that the deflecting member is normally straight and that it is homogeneous in material, constant in section, and submitted to an unvarying load. This assumption is very nearly true for the N.A.C.A. instrument, a considerable distance from the truth for the R.A.E. type, but it will be shown later that the distribution of load along the spring has very little effect on the error due to longitudinal acceleration.

In a flat spring, let w be the weight per unit length, x the distance from the free end of the spring, and k_x the acceleration normal to the plane of the spring in terms of g (taking the "acceleration" as including the component of gravity normal to the plane of the spring, so that it corresponds to the total air force acting on the aeroplane and preventing it from falling with an acceleration g downwards). Then the bending moment due to normal acceleration is:

$$M_x = \frac{-k_x w x^2}{2}$$

Integrating twice, the deflection at any point is found to be:

$$y_x = \frac{k_x w}{6EI}\left(l \times - \frac{x^4}{4}\right)$$

As regards the bending due to longitudinal accelerations of the spring, the moment arm of an element of mass at any point with respect to an axis of bending at any other point is equal to the difference between the normal deflections at the two points. The bending moment is then:

$$M_y = \int_0^{x_0} k_y w \left(y_0 - y\right) dx$$

where k_y is the longitudinal acceleration (including any component of gravity acting along that axis) in terms of g. Substituting the expression given above for y_0 and y,

$$M_y = \frac{k_x k_y w^2}{6EI}\int_0^{x_0}\left(l^3 x_0 - \frac{x_0^4}{4} - l^3 x + \frac{x^4}{4}\right) dx =$$

$$\frac{k_x k_y w^2}{6EI}\left(l^3 x_0 x - \frac{x_0 x^4}{4} - \frac{l^3 x^2}{2} + \frac{x^5}{20}\right)_0^{x_0} =$$

$$\frac{k_x k_y w^2}{6EI}\left(l^3 x_0^2 - \frac{x_0^5}{4} - \frac{l^9 x^2}{2} + \frac{x^2}{20}\right) =$$

$$\frac{k_x k_y w^2}{6EI}\left(\frac{l^3 x_0^2}{2} - \frac{x_0^5}{5}\right)$$

Dropping the subscript, since x_0 can have any value, and integrating twice we have:

$$y_y = \frac{k_x k_y w^3}{36E^2I^2}\left(\frac{l^3 x^4}{4} - \frac{x^7}{35} - \frac{4l^6 x}{5}\right)$$

Substituting β for x in the expressions for y_x and y_y, it appears that the deflections of the free end of the spring due to accelerations in the two directions are:

$$y_x = \frac{k_x w l^4}{8EI}$$

$$y_y = \frac{-9k_x k_y w^2}{560E^2I^2}.l^7$$

$$\frac{y_y}{y_x} = \frac{-9wl^3 k_y}{70EI} = \frac{72\,k_y.\,y_x}{70\,k_x.\,l}$$

The ratio $\frac{y_x}{k_x}$ is a constant for any given instrument, and is equal to the static deflection of the free end of the spring. The ratio of deflections is then

$$\frac{y_y}{y_x} = -\frac{36}{35}\frac{\delta_0}{\delta}.k_y$$

Since any change in deflection perpendicular to the plane of the spring gives rise to a change in the deflection due to forces acting parallel to that plane, there is a secondary effect which modifies y_y. If, for example, k_y acts toward the free end of the spring, so that y_y and y_x are in the same direction, the increase of y due to the addition of y_y will itself produce a further increase, and the total effect of longitudinal acceleration will be greater than that given by the first approximation written above. If the two deflections are opposed, on the other hand, the actual value of y_y will be less than that given by the approximate formula. These effects can be allowed for by substituting y_t, the total deflection, for y_x in the above equation, writing

$$\frac{y_y}{y_t} = \frac{y_y}{y_x + y_y} = -\frac{36.\,\delta_0}{35\,l}.k_y$$

$$\frac{y_y}{y_x} = \frac{-\frac{36\,\delta_0}{35\,l}.k_y}{1 + \frac{=36}{35.}.\frac{\delta_0}{l}.k_y}$$

In the glass fiber instrument devised and used at the Royal Aircraft Establishment β is 1.3 cm. and δ_0 ranges from .05 to .08 cm. For an acceleration of g along the axis of the spring $\frac{y_y}{y_x}$ would therefore be .05. The accelerometer may be placed with the axis of the spring coinciding either with the X or the Y-axis of the aeroplane. The accelerations along the Y-axis certainly never exceed g, whereas the computation of the behavior of a JN2 during a loop* shows that the longitudinal deceleration of that machine when pulling out of a dive may be as great as 1.92g. The conditions assumed in this problem were unduly severe, and g may be taken as the maximum acceleration along the spring axis to which the accelerometer will be submitted. In the R.A.E. accelerometer an acceleration of this magnitude would produce an error of + 5.43% or -4.89% in the determination of the normal acceleration, or a maximum error of .23g for the largest normal acceleration so far recorded. This is considerably greater than the sensitivity of the instrument, and shows that it is not safe to rely on its indications to within 0.1g.

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* Forces in Dive and Loop: Bulletin Aeroplane Engineering Department, U. S. A., June, 1918.

In the N.A.C.A. accelerometer as originally designed (not yet tried out) β is 12.7 cm., and δ_o is 0.006 cm. The maximum error due to a longitudinal acceleration of g under these conditions would be 0.05%, the plus and minus errors being practically identical. This is 0.002g for the maximum normal acceleration. It is evident that in this instrument, if it is satisfactory in other respects, the errors due to accelerations at right angles to the one to be measured will be small enough to be neglected with perfect safety.

Instruments such as the one designed by Dr. Zahm, using helical springs, are, of course, quite free from any errors due to longitudinal accelerations.

As has already been noted, the assumption of a uniform distribution of weight along the spring does not accord closely with the facts. If it be assumed, as an alternative, that all the weight is concentrated at the free end of the spring, the bending moment due to the normal acceleration is:

$$M_x = -W.k_x.x$$

The deflection due to normal acceleration is found by integrating twice:

$$i = \frac{1}{EI}.W.k_x\left(\frac{-x^2}{2} + \frac{l^2}{2}\right)$$

$$y_x = \frac{1}{EI}.W.k\left(\frac{l^2x}{2} - \frac{x^3}{6}\right)$$

The deflection at the free end, measured relative to the base, is then

$$yx_o = \frac{W.k_x}{EI}\left(\frac{l^3}{3}\right)$$

Proceeding in the same manner as for a distributed load,

$$M_y = k_yWy_x = \frac{W^2k_xk_y}{EI}\left(\frac{l^2x}{2} - \frac{x^3}{6}\right)$$

$$i_y = \frac{W^2k_xk_y}{E^2I^2}\left(\frac{l^2x^2}{4} - \frac{x^4}{24} - \frac{5l}{24}\right)$$

$$Y_y = \frac{W^2k_xk_y}{E^2I^2}\left(\frac{l^2x^3}{12} - \frac{x^5}{120} - \frac{5l^4}{24}\right)$$

The deflection at the free end, due to longitudinal acceleration, is

$$Yy_o = \frac{-W^2k_xk_yl^5}{E^2I^2}.\frac{2}{15}$$

Then

$$\frac{Yy_o}{Yx_o} = -\frac{Wk_yl^2}{EI}.\frac{2}{5} = -\frac{k_y}{k_x}.\frac{Kx_o}{l}.\frac{6}{5}$$

The error due to longitudinal acceleration in this case is therefore about 17% greater than in the case of a uniformly distributed loading. These cases are the extreme antitheses of each other and the true value of the error in either the R.A.E. or the N.A.C.A. instrument will lie somewhere between the two values found, as both these accelerometers have a tendency to concentrate the active mass near the free end of the springs.

Effect of Angular Accelerations

The effect of angular acceleration appears in two ways. In the first place, the spring, no matter where it may be placed, is affected by the angular acceleration as such. Secondly, if the origin of co-ordinates in the spring does not coincide with the center of gravity of the aeroplane an angular acceleration about the C.G. will give a linear acceleration to the spring.

The origin will be taken at the base of the spring as a first assumption, being shifted later to a more convenient and logically chosen location. An angular acceleration of k_a radians per sec. per sec., the base of the spring being assumed to remain stationary, imposes upon every element of length Δ x a load

$$\frac{X.k_a.W.\Delta x}{g}$$

where w is the weight per unit length. The shear at a distance x from the base is, integrating from the free end of the spring to the point in question,

$$S_a = \int_l^X \frac{x.k_a.W.dx}{g} = -\frac{k_a.W}{g}\left(\frac{l^2-x^2}{2}\right)$$

and the bending moment is

$$M_a = \frac{-k_a.W}{g}\Big(\frac{l^2x}{2} - \frac{x^3}{6} - \frac{l^3}{3}$$

Integrating twice more,

$$i_a = \frac{k_a.W}{gEI}\left(\frac{-l^2x^2}{4} + \frac{x^4}{24} + \frac{l^3x}{3}\right)$$

$$Y_a = \frac{k_a.W}{gEI}\left(\frac{x^5}{120} + \frac{l^3x^2}{6} - \frac{l^2x^3}{12}\right)$$

The deflection at the free end is then

$$Ya_o = \frac{k_a.W}{gEI}\left(\frac{11l^5}{120}\right) = \frac{11}{15} x \frac{l}{g} x\, k_a\, x\, \delta_o$$

The direct error arising from angular accelerations is therefore directly proportional to the length of the spring, and the R.A.E. instrument, with its very short spring, would seem to have a marked advantage in this particular. It is, however, evident that a judicious location of the origin of co-ordinates with respect to the C.G. of the aeroplane will introduce linear accelerations, resulting from angular accelerations, which will counterbalance the direct effect of the accelerated rotational motion.

The normal acceleration required to produce a deflection equivalent to that produced by the angular acceleration k_a would be of the magnitude

$$k_x = \frac{11}{15} x \frac{l}{} x\, k_a$$

where k_x is expressed in terms of ft. per sec. per sec. It is then evident that, if the center of gravity of the aeroplane lies in the plane of the spring and $\frac{11}{15}$ of its length from its base, there will be no deflection of the free end of the spring due to angular accelerations, the two manners in which the effects of such accelerations appear just cancelling each other. If the weight is concentrated at the tip of the spring, instead of being uniformly distributed along its whole length, the free end should obviously be at the C.G. Compromising between the two conditions it may be said that, for the accelerometers now in use, the location of the mounting should be such that the C.G. lies from 75% to 80% of the way out along the spring.

If the C.G. is not at the point thus defined there are, as has already been pointed out, two possible sorts of error. The first of these is the error due to angular acceleration when the C.G. lies in the axis of the spring. By properly choosing the origin in the spring the direct effect of angular acceleration can be eliminated, and the total effect can be reduced to that of a linear acceleration given (in terms of g) by the expression:

$$k_x = \frac{k_a\, x\, d}{g}$$

where d is the distance from the center of gravity of the aeroplane to a point in the spring and 75% of its length from the base.

The analysis of the "loop problem" already mentioned, showed that, under the conditions assumed, the angular acceleration about the Y-axis has a maximum value of 10.5 radians per sec. per sec. at the instant when the elevator was pulled up, that it falls to 2.4 radians per sec. per sec. in 0.3 second, and that it never rises above 1.0 radians per sec. per sec. after 0.9 sec. until the loop is completed. The assumption, made in this analysis, that the elevator is pulled up instantaneously is, of course, much too severe, and it is probable that 6.5 rad. per sec. per sec. is the largest acceleration in pitch that an aeroplane would ever have to undergo. Experiments on the rolling moment due to the ailerons suggest that the acceleration about the X-axis has a maximum value, on small and medium-sized aeroplanes, of about 5 rad. per sec. per sec.

If d_x, d_y, and d_z be the projections on the three axes of the distance from the origin of co-ordinates in the spring to the center of gravity of the aeroplane, it is evident that the maximum error due to acceleration in roll is 0.15g when d_y is 1 foot, and that the similar error arising from the pitching motion is 0.20g when d_x is 1 foot. Corrections can be made, using estimated values for the angular accelerations, which can be relied upon to reduce these errors by about 60%. In order that the normal acceleration, thus corrected, may be accurate within 0.05g, the value of d_x must be less than 7½" and d_y must not exceed 10".

The other source of error is the centripetal acceleration due to angular velocity. In the usual case, where the accelerations along the Z-axis are being measured, centripetal accelerations arise whenever there is any rolling or pitching motion if the active mass of the instrument is above or below the C.G. The acceleration is, of course,

$$k_z = \frac{w^2d_z}{g}$$

The loop analysis showed a maximum angular velocity of 1.81 radians per sec. occurring 0.4 sec. after the elevator was pulled up. Since the theoretical time for completing the loop was about a third less than actual measurement shows to be required, this maximum is about 50% too high, and the true maximum may be taken as 1.2 rad. per sec. Since it is reported that an aeroplane can be rolled onto its back in 3 sec., the maximum rolling velocity must be about 1.5 rad. per sec. The error when d_z is 1 foot would then be 0.07g. As in the case of angular accelerations, approximate corrections can be made, and the error reduced by at least 50%. To keep the corrected value of the normal acceleration within 0.05g of the truth, d_z must not exceed 16". This condition is easy to realize, and it will usually be found that the best place for mounting an accelerometer is directly above or below the C.G.

The dynamics of the accelerometer will be treated in a subsequent report.

NAVAL and MILITARY AERONAUTICS

N. Y.-Alaska Aeroplanes Reach Erie, Pa.

The four Army DH-4-B aeroplanes which left Mitchel Field, Long Island, on July 15, en route to Nome, Alaska, arrived at Erie, Pa., and due to weather conditions were still there on July 19th. As we go to press, Captain St. Clair Street, commander of the expedition, expected to leave for Grand Rapids, Michigan, the following day.

The trip to Alaska and return is expected to take 45 days. The personnel of the expedition other than the commander consists of 1st Lieutenant C. C. Nutt, 2nd Lieuts. C. H. Crumine and R. C. Kirkpatrick, and Sergeants Edmund Henriques, A. T. Vierra and J. E. English.

Aerial Shooting at Rifle Meet

Washington.—The Army Air Service will have representatives at the next annual meet of the National Rifle Association, Camp Perry, Ohio.

For the first time in the history of these matches, competitive aerial shooting will be included on the program.

Participation by the Army Air Service will demonstrate the value of military aviation in the national defense. The ground exhibit will be extensive, comprising aerial photography, including a photographic map of the reservation on which the shoot will be held, aircraft guns, aerial bombs, anti-aircraft guns and different types of aeroplanes "on the lines."

The aerial exhibit will include aerial acrobatics, competitive flights, closed course aerial races, wireless control of aeroplane formations and gunnery both from the ground and from the air. Actual firing from planes in the air will be directed against ground objects, silhouette targets and moving objects. There will be deflection practice against tower targets.

Navy Dirigible Hangar to be Largest in World

The mammoth airship hangar being constructed at Lakehurst, N. J., by the United States Navy is to be extended 200 feet over the original specifications, making the hangar the largest in the world.

The structure will be 1,000 feet long, 318 feet wide and 200 feet high. It is expected the hangar will be completed early next spring in time to house the giant dirigible R-38 after its flight across the Atlantic.

The hangar will be big enough to house two transatlantic liners of the size of the Leviathan, masts and all. It will be equipped with electrically operated doors each 177 feet by 136 feet. These doors when opened will form an effective wind break of nearly 600 feet that will assist in docking the big dirigibles.

The foundation and bases for the steel arches of the roof have been laid and several arches mounted.

Four Air Service Officers to Return to United States

The following named officers of the U. S. Air Service, at present on duty with the A. E. F. in Germany, have received orders to return to the United States, Captains Junius W. Jones, James L. Keane, and First Lieutenant Morris C. Handwerk and Harold A. Packard.

Aerial Photographic Mosaic and Demonstration at Fort Leavenworth

Since the Fourth Aerial Photographic Section reported at Fort Leavenworth, Kansas, 40 square miles in the vicinity of Easton, Kansas, have been photographed in one hour and fifteen minutes flying time, on 192 negatives at an altitude of 8000 feet on a scale og 1/8000, using a G.E.M. camera and a DH-4 plane. Prints from these negatives have been assembled into a mosaic to remain at the schools. This mosaic has been copied with a 20" by 20" copying camera to a scale of 3" to the mile and 15 of these prints have been delivered to the school of the Line and are being used in present instructional maneuvers.

Recently a DH-4B aeroplane flew to Kansas City, Missouri, where oblique photographs were made of the Union Station, Inter-City Viaduct and railroad yards. The seventy mile round trip was completed and dry prints in the hands of the class in two hours despite a delay due to inability to secure alcohol for quick drying.

Twelve hundred negatives have been made in eight hours flying time covering 250 square miles of a 300 square mile mosaic that will include the city of Leavenworth, Kansas, the Military Reservation and the ground usually included in the maneuver problems of these schools.

A series of 18 x 24 Centimeter obliques, views of this post and vicinity have been made with the F-1 camera mounted on the machine gun tourelle of a DH-4 B and ten prints of each negative have been delivered to the Commanding General of the Post.

Seaplane Flies by Radio Compass

Washington.—Guided entirely by radio compass signals, a naval F-5-L seaplane left Norfolk and flew ninety-five miles on a bee-line to pick up the battleship Ohio at sea, with no knowledge at the time of taking the air of the vessel's location. The seaplane then navigated its return to Norfolk entirely by radio compass.

Navy Department officials, to whom the flight was reported, said it was the first time radio compass apparatus had been used to direct aircraft to a ship.

Aerial Forest Patrol Detects 45 Fires

Forty-five fires were detected by the forest patrols of the Army Air Service in the National Forests of California during the period from June 15 to June 30, this year, according to a report of the Western Department of the service.

Of these fires, twenty-five were reported by the aeroplanes before they were made known from any other source. The report states that the aerial observers were 78.75 per cent accurate in locating fires.

From the Red Bluff patrol field eight fires were discovered from June 15 to 30; an area of 318,200 square miles was covered by the aerial observers; a flying time of seventy-five hours was recorded; and five aeroplanes were in commission at the field on June 30.

Thirteen fires were discovered from Mather Field during this period; 317,865 square miles were patrolled; 84½ hours of flying were done; and six aeroplanes were in commission there on June 30.

Twelve fires were discovered from March Field; 90,188 square miles of forest were patrolled; eighty-two hours and twenty-four minutes of flying was done; and four aeroplanes were in commission at that place on June 30.

From the Fresno Flying Field twelve fires were detected; 186,000 square miles were patrolled; seventy-seven hours and twenty minutes of flying was done; and three aeroplanes were in commission there on June 30.

Plan Officers' Club and Memorial Hall in New York

Following a luncheon given recently by Col. John W. Prentiss, at the Recess Club, 60 Broadway, New York City, a group of prominent men who for years have been actively interested in the progressive development of the army and navy, pledged themselves to life membership in the Army and Navy Club of America.

Together they will form a life membership committee, pledged to assist in carrying out the organization's plan to build in New York City a $3,000,000 service clubhouse and officers memorial hall. Members of the committee are: Rear Admiral Bradley A. Fiske, U. S. N. Retired, president of the club, Gen. William J. Nicholson, Maj. Gen. Samuel McRoberts, Col. Francis L. Robbins, Jr., Col. David M. Goodrich, Col. Prentiss, Maj. Francis M. Weld, Maj. Frederick H. Payne and H. C. Washburn.

With 200,000 officers who served in the World War eligible to membership, the club, it is believed will be one of the largest in the world.

Air Service to Maintain Own Communication

Captain C. C. Culver, Army radio expert, is spending a few days at March Field, Riverside, Cal. He is also spending some time at the balloon school at Arcadia and at Rockwell Field, San Diego, the purpose of his visit being to assist in organizing within the Air Service sufficient personnel to maintain methods of communication.

In the past all communication equipment, installment and operation, has for the most part been under the Signal Corps supervision. It has been determined by War Department officials that the Air Service shall maintain its own line of communications. This is to apply in particular to wireless telegraphy and wireless telephones, in which work Captain Culver has been interested for a number of years.

Additional equipment is now en route to this field, considerable of which will be utilized by the forest fire patrol service. It is decided to increase the lines of communication between forest rangers and pilots en-flight to the highest point of efficiency despite the excellent results that have obtained because of the forestry school maintained at this field last fall.

FOREIGN NEWS

From London to Norway

On June 25 Major Tryggve Gran repeated his flight across the North Sea. It may be recalled that he flew from Scotland to Norway in 1914, but last week he flew from London to Christiania, via Skagen. His flying time for the 750 miles from London to Christiania was 9 hours. He intends to make a flying circuit of Europe.

French Air Minister's Projects

M. Flandin, French Air Minister, at a lunch given to the sporting press recently, spoke of his project of putting at the disposal of a few groups a certain number of machines for aerial propaganda, and of his hope to be able to centralize meteorological services now dispersed in five Ministries.

Aerial Services in Brazil

The Brazilian Government has definitely signed a contract with the Handley Page Co., and it is expected that services will soon start. The first stage will be from Rio de Janeiro to San Paulo, the first step to linking up by air with Buenos Aires and ultimately with every city of any importance in Brazil, Uruguay and Argentina. At Rio the headquarters will be on the Ilha do Gouvernador, where there will be a flying school. From San Paulo, will be extended to Florianopolis, Porto Alegre, Pelotas, Montevideo and so to Buenos Aires. It is anticipated that the journey from Rio to Buenos Aires will take twenty hours against the six to eight days now required by steamer.

Super-Zeppelin Delivered to France

Maubeuge, France—The huge super-Zeppelin, L-72, surrendered by the Germans to France in accordance with the treaty of Versailles, recently arrived here.

Japs Planning Two Aviation Meets

The great and ever-growing interest in aviation in Japan is further evidenced by the announcement of the Imperial Aviation Society, of which Baron Sakatani is president, that two aviation meets will be held in Japan this summer. The first will be held the last week in this month as a special encouragement to civilian aviators.

Special prizes will be awarded civilian aviators who drive planes driven with Japanese-made motors. The meets will be held on the new aviation field at Susaki. The recent flight of army aviators to Seoul and return, and the arrival of the air fleet from Rome made up of Italian army aviators have aroused genuine enthusiasm.

More Entries for Antwerp

Italy has now entered eighteen machines for the competitions at Antwerp, including eight military land machines, four civil machines and six water planes. Another new entry is a four-seater S. E. A. by the Franco-Rumania Co. The other entries, as already announced, are one each Morane, Breguet and S. E.A.

The Leon-Morane Challenge Trophy

The Aero Club of France has now awarded the Leon-Morane Challenge Trophy and 10,000 francs to Jean Casale, the first aviator to hold the height record for a year since the prize was instituted on October 19, 1918. The stages of the contest were: May 9, 1919, Sadi Lecointe, 8,155 metres; May 19, 1919, Sadi Lecointe, 8,585 metres; May 28, 1919, Jean Casale, 9,125 metres; June 14, 1919, Jean Casale, 9,520 metres.

A Transatlantic Zeppelin Ordered

According to a Berlin wireless telegram, an American firm has placed an order with the Zeppelin Yard for the construction of an airship at the price of £175,000 for the inauguration of an airship service between New York, London and Berlin.

The Duration Record

The Commission Sportive Aeronautique of the French Aero Club has now homologated the speed, duration and distance records of the Farman Goliath piloted by Lucien Bossoutrot and Jean Bernard on June 4, 1920. The exact figures are: Duration 24 h. 19 m. 7 s., distance 1,915 kiloms. 200 meters; speed 1,000 kiloms. in 10 h. 19 m. 66s.; 1,500 kiloms. in 16 h. 42 m. 8s.

Aviators L. Bossoutrot and J. Bernard, who recently in a Farman Goliath broke the world's endurance record by remaining in the air 24 hours, 19 minutes

Aircraft Distress Signals

Mariners and others are notified by the British Admiralty that when any aircraft is in distress and requires assistance the following will be the signals displayed by her, either together or separately: (1) The international signal "S.O.S.," by means of visual or wireless telegraphy; (2) the international code signal of distress, indicated by N. C.; (3) the distant signal, consisting of a square flag having above or below it a ball, or anything resembling a ball; (4) a continuous sounding with any sound apparatus; (5) a signal consisting of a succession of white Very's lights fired at short intervals.

French Air Attachés

One of the clauses of a bill for safeguarding the French national interests in connection with aerial services has been drafted under the direction of the Under-Secretary of State for Aerial Transport, provides for the appointment in the more important foreign capitals of an air attaché. This official would be charged with the duty of collecting information with regard to the progress of aeronautics in the country to which he was apopinted, and would keep the French Air Ministry informed of all developments.

Paris-Athens Three Days a Week

Success has followed the inauguration of the Paris-Athens aerial express, and the journey is now made three times a week. The time occupied is about 105 hours, owing to delays at Uskub and Belgrade.

Diamonds by Air

A new use of the Air Mails has been instanced in the carriage the other day by one of the machines employed on the Paris-London (Handley-Page) service of a single stone diamond ring valued at nearly 250,000 francs. The packet was consigned to a wealthy merchant in London, and on arrival here it was taken straight by hand by one of the Handley-Page representatives to its destination.

This carriage of valuable jewelry by air offers a way to escape some of the risks of loss by such thefts as have so often occurred in the course of land and sea transit by clever gangs. A firm's representative can hand a packet direct to the man on the plane in Paris, and if this is carried on the person of the pilot, there cannot be the faintest chance of his being robbed until he touches ground at his destination again, when the packet can be received at once by the consignee or his representative. Certainly there is no risk of the plane being "held up" by an armed robber, and still less chance of the pilot being "sandbagged" and robbed.

Protocol to International Air Convention

The British Air Ministry makes the following announcement:

It was hoped, when the International Air Convention was drawn up, that the states which remained neutral during the war would in due course adopt the Convention so that a uniform system of international control of the air might come into force on the ratification of the Convention by the allied and associated powers.

It was found, however, that certain neutral countries, e. g., Norway, Sweden, Denmark, Switzerland and Holland, were not prepared to accept the Convention.

The principal ground of objection on the part of neutrals was Article 5 of the Convention, which binds contracting states to forbid the flight over their territory of aircraft of non-contracting states. This would make it impossible for neutrals, were they to adopt the Convention, to allow freedom of flight over their territories to aircraft of the late enemy countries—although they have enjoyed such intercourse throughout the war—until such time as the latter also became parties to the Convention. In the case of the Allies, the same difficulty would not arise, since, although bound by Article 5, they possess, under the peace treaties and independently of reciprocity, rights of flying over the late enemy countries.

In order to meet this main objection of neutral countries a protocol to the Convention was drawn up by the Council of Ambassadors, on the recommendation of the Aeronautical Commission in Paris, whereby exceptions—formally termed derogations—in regard to Article 5 of the Convention may, on good reason being shown and with the consent of the contracting states, be permitted. By this means a state which has accepted the Convention in other particulars will be authorized to permit the flight over its territory of the aircraft of specified non-contracting states. These derogations will be for a limited period, but will be renewable unless an objection is lodged by a contracting state. The protocol has now been signed by most of the contracting states. The following are the texts of Article 5 of the International Convention and of the protocol referred to above:

ARTICLE 5

"No contracting state shall, except by a special and temporary authorization, permit the flight above its territory of an aircraft which does not possess the nationality of a contracting state."

The high contracting parties declare themselves ready to grant, at the request of signatory or adhering states who are concerned, certain derogations to Article V of the Convention, but only where they consider the reasons involved worthy of consideration.

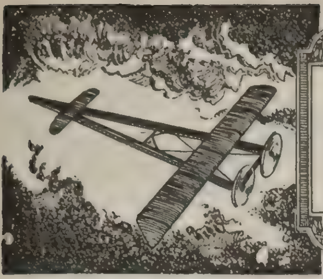
The requests should be addressed to the Government of the French Republic, who will lay them before the International Commission on Aerial Navigation provided for in Article 34 of the Convention.

The International Commission on Aerial Navigation will examine each request, which may only be submitted for the acceptance of the contracting states if it has been approved by at least a two-thirds majority of the total possible number of votes; that is to say, of the total number of votes which could be given if the representatives of all the states were present.

Each derogation which is granted must be expressly accepted by the contracting states before coming into effect.

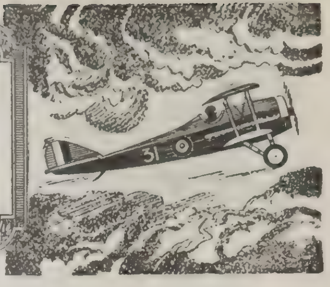
The derogation granted will authorize the contracting state profiting thereby to allow the aircraft of one or more named non-contracting states to fly over its territory, but only for a limited period of time fixed by the text of the decision granting the derogation.

At the expiration of this period the derogation will be automatically renewed for a similar period unless one of the contracting states has declared its opposition to such renewal.



ELEMENTARY AERONAUTICS and MODEL NOTES

By John F. McMahon



The Construction and Design of Aviette's Wing Curves

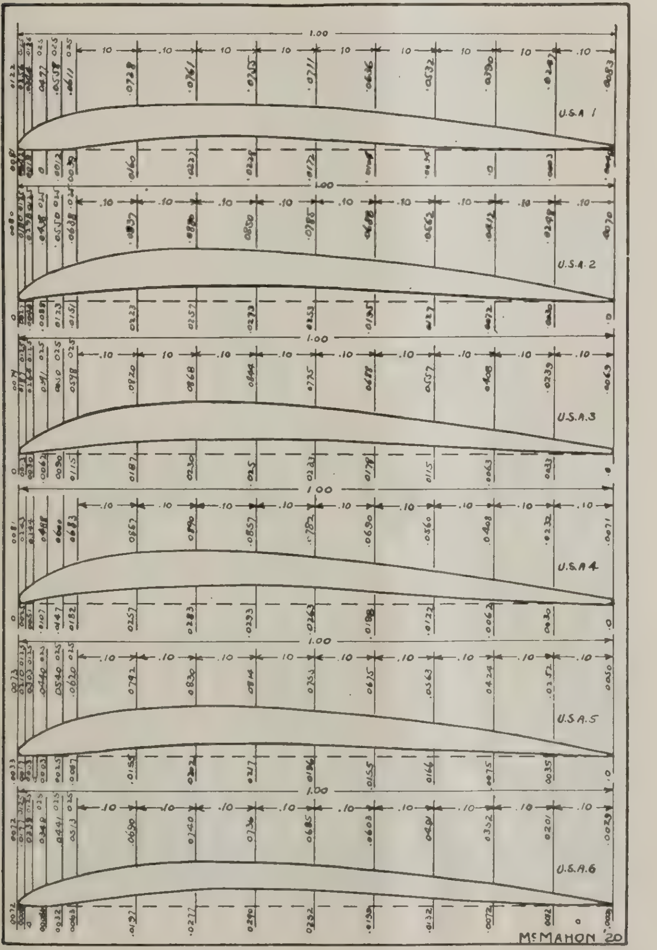
(Continued from last week)

U. S. A, 1

L of i	*Ky*	*Kx*	*L/D*	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000399	.0001515	2.64	....
— 2°	.000156	.0000905	1.72	....
— 1°	.000432	.0000700	6.15	.620
0°	.000721	.0000653	11.00	.530
1°	.000936	.0000670	14.00	.463
2°	.001146	.0000688	16.60	.415
4°	.001510	.0000860	17.50	.340
6°	.001878	.0001158	16.20	.316
8°	.002230	.0001558	14.30	.303
10°	.002580	.0002055	12.60	.290
12°	.002910	.0002595	11.20	.283
14°	.003165	.0003040	10.40	.274
16°	.003165	.0003710	8.50	.276
18°	.003080	.0005520	5.60	.310
20°	.002882	.0008500	3.40	.360

U. S. A. 2

L of i	*Ky*	*Kx*	*L/D*	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000228	.000147	— 1.55	....
— 2°	.000363	.000108	3.37	.733
— 1°	.000625	.0000943	6.64	.522
0°	.000862	.0000872	9.88	.445
1°	.001075	.0000816	13.26	.388
2°	.001292	.0000848	15.22	.352
4°	.001678	.0001027	16.34	.317
6°	.002090	.0001320	15.80	.292
8°	.002432	.000175	13.88	.276
12°	.003179	.000270	11.75	.255
16°	.003362	.000410	8.10	.247
18°	.003100	.000701	4.41	.228
20°	.002770	.000871	3.18	.230



U. S. A. 3

L of i	*Ky*	*Kx*	*L/D*	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000506	.0001589	—3.19	....
— 2°	.000420	.0001052	3.99	.676
— 1°	.000692	.0000845	8.20	.482
0°	.000928	.0000835	11.10	.403
1°	.001123	.0000856	13.10	.353
2°	.001210	.0000889	14.75	.323
3°	.001508	.0000893	16.16	.295
4°	.001704	.0001073	15.88	.280
5°	.001919	.0001180	16.80	.260
8°	.002520	.0001823	13.82	.230
10°	.002905	.0002290	12.70	.220
12°	.003160	.0002830	11.15	.208
13°	.003235	.0003142	10.30	.204
14°	.003240	.0003410	9.50	.197
15°	.003215	.0003780	8.50	.197
16°	.003155	.0004460	7.02	.197
18°	.003125	.0006620	4.73	.236
20°	.002889	.0008570	3.37	.266

U. S. A. 4

L of i	*Ky*	*Kx*	*L/D*	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.0001231	.0001640	—0.75	....
— 2°	.0005200	.0001150	4.52	.670
— 1°	.0007650	.0001078	7.11	.525
0°	.0009750	.0001032	9.44	.461
1°	.0011840	.0001002	11.80	.416
2°	.0013820	.0000995	13.90	.388
4°	.0017700	.0001115	15.88	.347
5°	.0019800	.0001340	14.80	.330
8°	.0025600	.0001900	13.50	.298
10°	.0029900	.0002555	11.70	.273
12°	.0033100	.0003100	10.67	.276
14°	.0036000	.0003545	10.15	.276
16°	.0036150	.0004430	8.15	.276
18°	.0034700	.0005580	6.22	.303
20°	.0031000	.0007640	4.06	.335

U. S. A. 5

L of i	*Ky*	*Kx*	*L/D*	Distance of C. P. from leading edge, in fractional part of chord.
— 4°	—.000326	.0001500	—1.58	....
— 2°	.000346	.0000948	3.64	.753
— 1°	.000636	.0000830	7.67	.566
0°	.000910	.0000741	12.28	.498
1°	.001145	.0000803	14.28	.444
2°	.001355	.0000863	15.72	.415
3°	.001565	.0000966	16.21	.377
4°	.001740	.0001092	15.98	.348
5°	.001950	.0001290	15.35	.337
8°	.002470	.0001830	13.52	.315
10°	.002870	.0002380	12.08	.303
12°	.003130	.0002890	10.84	.300
13°	.003240	.0003290	9.84	.298
14°	.003285	.0003545	9.25	.288
15°	.003235	.0003910	8.28	.292
16°	.003205	.0004210	7.63	.298
18°	.003150	.0006900	4.57	.330
20°	.002790	.0008200	3.41	.368

U. S. A. 6

L of i	*Ky*	*Kx*	*L/D*	Distance of C. P. from leading edge in fractional part of chord.
— 4°	—.000276	.0001395	—1.98	....
— 2°	.000272	.0000793	3.43	.910
— 1°	.000567	.0000671	8.46	.600
0°	.000845	.0000650	13.00	.498
1°	.001057	.0000668	15.88	.458
2°	.001255	.0000733	17.15	.439
3°	.001455	.0000858	16.98	.402
4°	.001662	.0000976	17.95	.388
5°	.001846	.0001121	16.48	.365
8°	.002415	.0001665	14.50	.322
10°	.002650	.0002160	12.27	.306
12°	.002861	.0002820	10.15	.310
13°	.002910	.0003260	8.94	.310
14°	.002980	.0004050	7.37	.310
15°	.002960	.0005300	5.58	.328
16°	.002900	.0006380	4.55	.346
18°	.002790	.0007900	3.53	.365
20°	.002585	.0009000	2.88	.388

This much for the wings we will next consider surfaces that have no cambers such as rudder and tail planes.

(To be continued next week)

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Flying Cadet

Between the dark and daylight
  When taps have long since blown,
Then comes the flying cadet's hour
  And he thinks of Home sweet Home.

He thinks of the day and its studies
  And work that is yet to be done,
Before he becomes a flyer
  In the pilots' school at Carlstrom.

Army Regulations and Courts Martial, too,
  Theory of Flight and Motor Work
All come before he's through.

Yes, there still remains wireless,
  Machine gunnery to master he'll try,
But he'd send those studies all to Hades
  For just a chance to fly.

A smile breaks o'er his features;
  He thinks of the day he'll try,
With a Prince of good fellows, an instructor
  To teach him how to fly.

Flying Cadet, Samuel C. Chapkowitz.

MAYOR HYLAN'S SKY COPS

(*Courtesy N. Y. World*)

For Safety's Sake

"Dear God," prayed golden-haired little Willie, "please watch over my mamma."

And then he added as an afterthought. "And I dunno as it would do any harm to keep an eye on the old man, too."

Long Distance Stuff

"And now that you have heard my daughter sing," said the fond parent, "what do you think of her range?"

"Well," answered the former aviator candidly, "I should say she ought to kill at three miles, all right."

American Legion.

That's What Makes 'Em Afraid

There is no reason why people should not take more to flying because when they are in the air their fears are groundless.—*Electrical Experimenter.*

The Test of Carrying Capacity

A wedding cake has been transported from New York to Omaha by aeroplane. Which, from our experience with that kind of pastry, proves beyond all shadow of doubt there is no limit to the weight a plane can carry.—*New York Globe.*

Letters From Privut Pete

My dere Editer:—P'rhaps you noticed, as I have, that most everybody with a literary inclination claims first hand knowledge of Omar's Rubaiyat. Never knew the gentleman myself, but it seems sort of habitual to admire his writings, so I'll fall in and follow the crowd. Jack Gallet, ex-army pilot, now employed by the Curtiss company, is in the same boat and herewith extends "A Prohibition Rubaiyat" with apologies to Geo. S. Chappell. Read it:

Before the phantom of Near-beer was tried, Methought a Voice within the Tavern cried—"When all the Cocktails are prepared within, Why nod the drowsy Bevo-birds outside?" Myself, when young, did earnestly frequent Tap-room and Bar, with many another Gent; And loudly sang, till I was rudely thrust Through the same Swinging doors wherein I went. Well I remember how, with brave carouse, I took one Mamie Taylor to my house, And there, with Widow Cliquot, just we three, acquire a great and monumental Souse.

I sometimes think that never blooms so red the Nose, as where some buried Highball sped; That every pound of Paunch the Clubman wears, dropepd in his Lap from his once aching Head. A book of Curses underneath the bough; a glass of Milk, a cake of Yeast, a Cow, and Congress crying "This is Paradise!" Ah! Paradise were wilderness, I vow.

Then fill the cup; and, in the fire of Spring, the black frock-coat of Prohibition fling. Our private-stock has but a little way to Flutter, and, Lord knows, it's on the wing. And when, like Ganymede with brimming glass, the Waiters their clandestine Cocktails pass, And on their happy errand reach the Spot where I make moan—fill up my Demi Tasse!

Thirstily Yours,
"PETE."
(*Fly-Leaf*)

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and many others.

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(*Continued from page 673*)

torney General in his task of getting refunds from the manufacturers who have illegally or fraudulently obtained monies, and punish those who are responsible for the crimes reported by Congress.

"2. Whether to remain neutral and assume the position of a jury, or judge, giving only an opinion if asked.

"3. Whether to join the defense and let those accused of the evils referred to, use the Club as a shield to help defeat the purposes of justice (This is only stated to explain the situation clearly and completely).

"It is obvious that from a patriotic and ethical standpoint, a national organization like the Aero Club of America, which conducted the campaign for large appropriations for national defense, has a solemn, moral obligation to assist the Government in every way.

"If the Board does not feel that it should assist actively in the task of bringing the guilty ones to justice, then it is obvious that the only position compatible with our position is to remain neutral.

"We cannot negotiate with the people who are trying to get in the Club at present without breaking faith with the American public, without staining the Club's good name, without sacrificing the Club's liberties, ending its usefulness as a moral force and becoming identified with the aircraft scandals and assuming responsibility in connection with crimes committed by individuals of apparently low moral standard.

"In view of the facts, I believe that the Club should not take any steps which may be interpreted as negotiations with the individuals accused by the Government, nor give any openings to these individuals to use the Club as a shield or to make it appear, as they have during the past two weeks, that they are to be taken into the Club.

"Very sincerely yours,
"(signed) Henry Woodhouse."

The minutes of that meeting show that the Chairman of the "Co-operating Committee" moved that Mr. Woodhouse's letter be referred to his Committee and that he took the letter. There is no record of any report having been made or any actions having been taken on the important issues explained in the letter.

15. At the following meeting of the Board of Governors a letter signed by the Chairman of the "Co-operating Committee" was presented stating that the plans for amalgamation of the two Clubs which had been proposed by a duly authorized Committee of the Flying Club had been repudiated by officers of the Flying Club and, apparently, the matter was a closed incident. Deponent decided to request full information regarding same and urged, with other officers of the Club, that an investigation be conducted by the Board of Governors of the Club to find the parties responsible for the slanderous and vicious reports and mis-statements that have been circulated against the Aero Club and its officers during the past year. A formal request to this effect is to be made upon the Board of Governors at the meeting to be held on July 21st.

16. That the deponent on July 15, 1920, received a letter signed by the acting president of the Aero Club of America, reading as follows:

"Major Charles J. Glidden,
297 Madison Avenue,
New York City.

"Dear Major Glidden:

"A meeting of the Board of Governors of the Aero Club of America will be held on Wednesday, July 21st, at one o'clock, in room 6 of the Bankers Club, 120 Broadway, New York City. You are earnestly requested to be present.

"Among important matters to be considered at this meeting the Committee on Co-operation will present its report, regarding the steps necessary to carry out the amalgamation of the American Flying Club with the Aero Club of America. The plan as heretofore approved by the respective Boards of Governors of the two clubs contains the following general provisions.

"1. Members in good standing in the Flying Club shall be eligible to membership in the Aero Club, without election and without the payment of initiation fee or current dues.

"In lieu of such initiation fees and dues the Flying Club will turn over to the Aero Club all furniture, pictures, books and trophies now belonging to the Flying Club.

"2. Amendments to the Constitution and By-Laws of the Aero Club are to be made to prevent the commercialization of the Club. These amendments provide that no person shall be eligible, or act, as an officer, governor or chairman of a committee whose income is, in a considerable amount, derived from any commercial interest in aeronautics, or from trade papers. They also carefully safeguard the use of the name of the Club in connection with expositions, contests and business affairs.

"3. A complete new Board of Governors of the Aero Club is to be elected. The membership of this Board is to be determined by a committee of six, three from each Club.

"4. The Aero Club is to assume the lease of the present Club House of the Flying Club, and to make that house the Club House of the enlarged Aero Club. In taking over this house, the Aero Club is to repay, over a term of years, the amount ($20,924.40) which has heretofore been expended upon the house in making it available for Club purposes.

"Beyond this specified amount, the Aero Club assumes no financial liabilities in the settlement of the affairs of the Flying Club.

"Full details of the proposed amendments to the constitution and by-laws will be presented to the meeting, together with the plans for a Special Meeting of the Club to consider and act upon all matters connected with the amalgamation.

"Very truly yours,
"(signed) Charles Jerome Edwards,
Acting President."

17. That the deponent and many other officers and members in good standing of said Aero Club of America are in good cause dissatisfied with the action taken or proposed to be taken, by the Acting President of the Club, set forth in the letter signed by him and reproduced heretofore, and that among the reasons and causes for their dissatisfaction are the following:

(a) That the deponent and other officers and members of the Aero Club of America have received advice from sources which they believe reliable that the cost of establishing and operating the American Flying Club has exceeded the income by approximately $50,000, and that the Flying Club is operating under large financial losses; and that one of the purposes of the pernicious activities and misrepresentations circulated by agents of the Flying Club about the Aero Club of America has been to "worry" the officials of the Aero Club and force them by such and other means to take over the Flying Club with its financial liabilities;

(b) That, as the evidence shows that the scheme of taking over the American Flying Club and the operation of the American Flying Club buildings would be injurious to the Aero Club of America and would involve said Aero Club into financial obligations which would take its Treasury surplus, and would further make the Club assume heavy financial liabilities in the operation of the Flying Club House, extending beyond its financial assets and resources, therefore many officers and members of the Aero Club of America in good standing realize that if they consented to this scheme they would be in the same position legally as if they had consented to a scheme to dissipate the Club's funds and to involve the Club in financial deficits by mismanagement of the Club's affairs;

(c) That the officials of the Aero Club have found evidence which they consider reliable that over one thousand members of the Aero Club of America have withheld payment of their dues because of the persistant reports of the proposed amalgamation, and that they would resign if the Aero Club of America should entertain the proposed amalgamation with the Flying Club;

(d) That a number of members of the Flying Club who are also members of the Aero Club and who have become acquainted with the pernicious activities of agents of the Flying Club are resigning from the latter and would resign from the Aero Club if the amalgamation should go into effect as shown by the letter reproduced herewith, which was received by the Aero Club from a member of both Clubs, unsolicited and without our previous knowledge of his feelings.

"July 10, 1920.

"Mr. Augustus Post, Secretary,
Aero Club of America,
297 Madison Avenue,
New York City.

Dear Mr. Post:

"I have this day resigned my membership in the American Flying Club. Should the American Flying Club be consolidated with the Aero Club of America, I wish to resign from the consolidated clubs. Should, however, the Clubs continue

We have a few slightly used two-passenger Avro aeroplanes for immediate delivery. Inspection can be made at our shops by appointment. Prices $3,000 F.O.B., N. Y. Attractive discount on quantity purchases.

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as separate organizations, I wish to continue my membership as an Army and Navy member of the Aero Club of America

"With best wishes,

"Yours cordially,

"(signed) Milton A. Stone.

(e) That the secretive methods employed by those individual governors of the Aero Club of America who conducted the negotiations with the Flying Club and the refusal to give information to other officials of the Club regarding these negotiations and the financial liabilities and cost of operation of said Flying Club is contrary to and violates the provisions of the Constitution and By-Laws of the Aero Club of America.

(f) That the Aero Club of America has already been seriously damaged by the irregularities and objectionable actions heretofore set forth and other similar actions and is in danger of being plunged into bankruptcy by the proposed amalgamation with the American Flying Club, which also proposes the assumption on the part of the Aero Club of America of liabilities amounting to $20,964.40 and the additional heavy liabilities of operating the expensive buildings of the said Flying Club.

18. That in the letter received by deponent from said Charles Jerome Edwards, acting president of the Aero Club of America, dated July 14th, 1920, which, deponent is advised, was sent to him as a legal notice of actions which said Charles Jerome Edwards and his associates intend to put into effect, it is stated that

"The Aero Club is to assume the lease of the present Club House of the Flying Club, and to make that house the Club House of the enlarged Aero Club. In taking over this house, the Aero Club is to repay, over a term of years, the amount ($20,924.40) which has heretofore been expended upon the house in making it available for Club purposes."

19. According to statements made to the Board of Governors of the Aero Club of America by Charles L. Poor, in the presence of deponent and of Alan R. Hawley, Rear-Admiral Bradley A. Fiske, W. W. Miller, Henry Woodhouse and Charles Jerome Edwards, said lease of the Flying Club covers three houses involving a payment of approximately $30,000 per year in rentals and taxes, and the leases are subject to cancellation on short notice by the owner upon payment of $20,000.

20. That, on the other hand, the Aero Club of America has arranged to continue its lease for its present sumptuous and centrally located Club House and headquarters at No. 299 Madison Avenue, Borough of Manhattan, City and State of New York, at the low rental of only $12,000 per year, and that the renewing of its lease on the present very satisfactory Club House will permit it to continue to use its present furniture and, therefore, will not be involved in any expenditures and will, therefore, retain its Treasury surplus.

21. That the Treasury surplus of the Aero Club of America is less than $15,000, and will be less than $10,000, half of which sum is obligated and required to operate the Club to the end of the fiscal year.

22. That it is evident from the foregoing that the Aero Club of America is not financially in a position to consider taking over the lease of the present Club House of the American Flying Club nor to take over the obligation to pay the $20,924.40 to the Flying Club, proposed in the letter of said Charles Jerome Edwards; nor to assume the further large financial deficit and losses of continuing the lease of said Flying Club or the heavy deficits involved in the operation of the leases and houses of the said Flying Club.

23. Further, that the Aero Club of America does not need and has no use for the furniture and trophies of the American Flying Club, as it is known by the officials of the Aero Club of America that the Club already has a surplus of furniture and has such a large collection of important international and national trophies which it has won, valuable paintings, autographed photographs from aeronautic celebrities and other trophies that it cannot find sufficient space on its walls to properly display all of them.

24. That in view of the foregoing, deponent as an active officer and member of the Aero Club of America would be guilty of dissipation of the funds of the Aero Club of America, for which he, as an officer, is responsible, if he permitted or approved the carrying into effect of the proposal contained in the letter of said Charles Jerome Edwards, dated July 14th, 1920, which it is proposed to put into effect on July 21st, 1920, to assume the lease of the buildings leased by the said Flying Club.

25. That for the above stated and other reasons, the deponent and other governors and members of the Aero Club of America in good standing are in good cause dissatisfied.

CHARLES J. GLIDDEN.

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VOL. XI AUGUST 2, 1920 NO. 21

TABLE OF CONTENTS

PAGE

Evidence of Conspiracy to Destroy Aero Club of America Submitted to the Supreme Court of New York 703

The News of the Week............ 706

The Aircraft Trade Review....... 708

The Avro "Baby" Sport Biplane... 709

The Structural Analysis and Design of the Aeroplane............... 710

The Fairchild Distant Control for Aerial Cameras................ 713

Report of the Latest Congressional Investigation of Billion Dollar Aircraft Expenditures.......... 714

Foreign News.................... 715

Elementary Aeronautics and Model Notes 717

Aeronitis........................ 718

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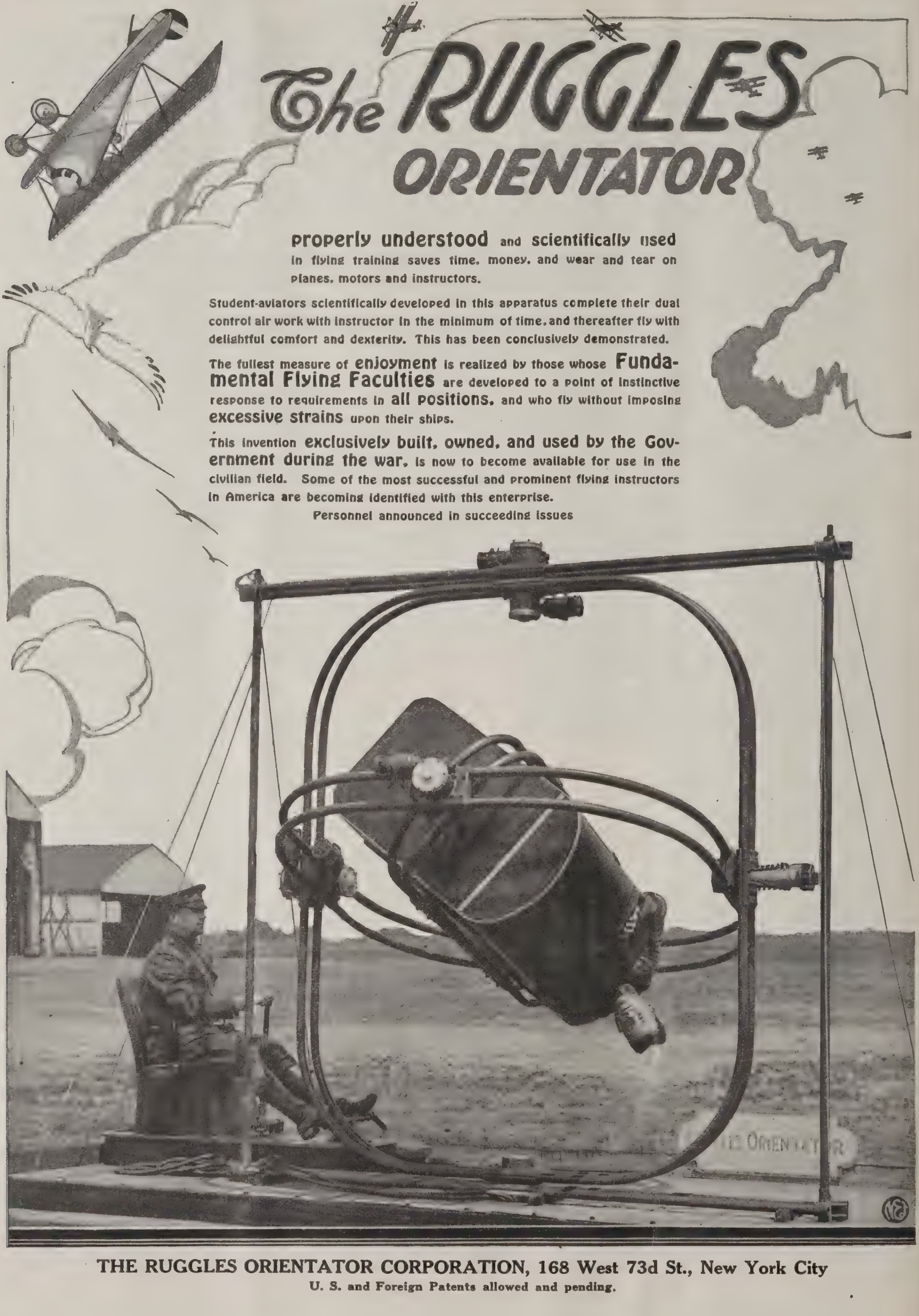

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WEEKLY

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EVIDENCE OF CONSPIRACY TO DESTROY AERO CLUB OF AMERICA SUBMITTED TO THE SUPREME COURT OF NEW YORK

Mr. Woodhouse's Affidavit, Filed Through His Attorneys, Nugent and Nugent, 280 Madison Avenue, N. Y. City, in Conjunction With the N. Y. Supreme Court Action, Announced Last Week, Submitted the Following Evidence of Conspiracy to Destroy the Aero Club of America:

Henry Woodhouse, being duly sworn and deposed, says:

(1) I am a member in good standing of the Board of Governors of the Aero Club of America and am familiar with the Club's activities, having been elected unanimously to serve on said Board first in November, 1914, for a period of four years and then re-elected in November, 1918, for another term of four years, and having participated actively in the management of the Club's affairs since the year 1911.

(2) That I am familiar with the financial status of the Aero Club of America and the connections of the defendants to the Club and also with the activities of the American Flying Club and Manufacturers' Aircraft Association.

(3) Further, having been active in the Club management and in the affairs of the Aero Club of America, I know of the existence of reliable evidence of existing schemes to destroy the Aero Club of America, and I am prepared to submit full and reliable evidence to support this statement and to prove that the relief prayed for by the said deponent in this action is necessary to protect the said Aero Club of America from immediate destruction and protect its officers and members, who number approximately three thousand, from financial and moral responsibilities and damages for which they would be legally and morally responsible and liable, if the actions complained of are not stopped or prevented.

(4) I know by eight years of personal experience as an active official of said Club, and can prove by thousands of letters and documents, that owing to the powerful influence which the Aero Club of America has exerted upon national affairs during the past eight years and especially during the World War, and owing further to the fact that the recommendations of the Aero Club of America have always received the serious consideration of the Government and Congress; that the advice, approval and support of the officials of the Club was diligently sought by Government officials and by various officers in the Army, and commercial interests, whenever Government action was desired on aeronautic projects.

At times the projects for which the Club's approval and support was sought were commendable; at times they were of doubtful value, at times they were clearly against the best interests of the country. The policy of the officials of the Club was to only endorse and support those projects which were clearly for the best interests of the country.

(5) I also know intimately of the high standing of the Club and its officers with the highest Government officials through my experiences before and during the war and after the signing of the Armistice, having from time to time since 1913 and as late as a few weeks ago been invited to confer with Congressional and other Government bodies on proposed national aeronautical projects.

Prepared Reports for President Wilson, Secretary of War Baker and U. S. Senate

I especially had occasion to find the high opinion entertained by high Government officials during the war when I was asked by a confidential advisor of President Wilson and Secretary of War Baker to prepare a confidential report on the aircraft situation, which I did; and subsequently other active officials of the Club and myself were invited repeatedly to confer with U. S. Senate and House of Representatives committees and with the various executives of the Air Service and Aircraft Board and other high government officials.

Plans drawn by me for the building of the Military Air Service were first adopted by the War Department and submitted to Congress by the Department as sound recommendations in the year 1913 and were included in the reports of the hearings of the Committee on Military Affairs of the House of Representatives of the Sixty-third Congress, August, 1913. A number of other recommendations and plans, prepared, drawn, and presented by me have been adopted by the War and Navy Departments and by Congress each year. The last of my recommendations adopted by Congress was in June, 1920.

Reports prepared by me for President Wilson and Secretary Baker cover fifty-eight printed pages of the hearings of the Committee on Military Affairs of the United States Senate, Sixty-fifth Congress.

The Textbooks on Military and Naval Aeronautics written by me were adopted by the Armies and Navies of the United States and Allied countries and generally praised by hundreds of the highest Army and Navy authorities.

Received Complaints of Shortcomings

(6) Owing to the fact that the said Aero Club of America acted as a moral force in the Aeronautic Movement, there were submitted in the past to the active officers of the Club complaints regarding alleged shortcomings of individuals and organizations. Whenever such complaints were received which dealt with Government matters, copies of the complaint were sent to the proper Government officials with request for advice as to what steps they thought the Club should take, if any. I quote herewith cases which have a direct bearing on this action, which are, however, only some of a number of similar cases also having a bearing on this action, evidence of which will be produced at the proper time and place.

$4,000,000 Profit On $13,000,000 Contract

(7) On or about October, 1918, the Aero Club of America received a complaint to the effect that two of its members had been guilty of a conspiracy against the Government and had obtained large sums from Government agencies under misrepresentations. As the name of Mr. Bernard Baruch, the Chairman of the War Industries Board, was mentioned in the complaint as having protested against some of the

alleged irregularities, a copy of the complaint was sent to Mr. Baruch, with a letter reading as follows:

"October 8th, 1918.

"Mr. Bernard M. Baruch,
"American War Industries Board,
"Washington, D. C.

"My dear Mr. Baruch:

"One of the results of the patriotic efforts of the Aero Club of America is that here are referred to the Executive Committee queries of all kinds. At times these inquiries are regarding alleged wrongs or misdoings.

"In such cases the Executive Committee tries to run down the rumors and ascertain the facts in the case.

"The enclosed report is one submitted to the Executive Committee of the Club, and as your name is mentioned in it we are sending it to you.

"We appreciate that you are just as anxious as we are to run this rumor down if it is not true, or to punish the people involved if it is true. For this reason we are bringing it to your attention.

"Would it be possible for you to advise us what the truth of the mater is?

"If it is possible for the Aero Club of America to be of assistance to you in your great work, please do not hesitate to call on us.

"With best regards, I remain,

"Yours very sincerely,
"THE AERO CLUB OF AMERICA.
"(Signed) Augustus Post,
"Secretary."

A photographic copy of the answer of Mr. Bernard Baruch is appended herewith. Part of Mr. Baruch's statements in said letter read as follows:

"It was one of the worst contracts I ever saw, involving such a huge profit that I refused to approve it or to make the recommendations that the money could be obtained from the Treasury. * * *

"Immediately on my objection $1,300,000 was taken off the contract, which at the time it was reported to me showed a profit of some $4,000,000 on a $13,000,000 contract."

I have been informed and believe, therefore aver, that the money referred to by Mr. Baruch was obtained from the Treasury without Mr. Baruch's approval; and I know that the individuals named Conger and Diffin referred to in the letter from Mr. Baruch, and alleged to have engineered this plan, are Roy U. Conger and F. G. Diffin, who, as shown by the incorporation papers and other documents of the American Flying Club, were the prime movers in the organization of the said Flying Club which was first named the "International Air Service Club of America" and are now, or have been until recently, vice-president and treasurer of the said Flying Club. I am informed and believe, therefore aver, that Federal action on this case has been delayed by the fact that the officials who had the authority to request the Department of Justice to conduct an investigation of this case were volunteers in Government service and resigned their positions following the signing of the Armistice and the Department of Justice could not take the initiative in instituting investigations before Federal Grand Juries in this and similar cases until April, 1920, when it was authorized to do so by resolution of Congress. This case is, I understand, to be investigated by the Department of Justice during the coming week. I personally wrote to the Attorney General regarding this and other actions on July 6th, 1920, and have received the following letter from the Acting Attorney General:

"Office of the Attorney General,
"Washington, D. C.
"July 15, 1920.

"Mr. Henry Woodhouse,
"280 Madison Avenue,
"New York City.

"My dear Sir:

"I have your letter of the 6th instant and beg to advise that the subject matter therein will be given attention upon the return of the Attorney General to the city early next week.

"Very truly yours,
"(Signed) WM. L. FRIERSON,
"Acting Attorney General."

Placed Aero Club in a Delicate Position

Pending Government investigation of the case the officials of the Club have been placed in a very delicate position by the fact that the individuals mentioned in connection with this apparent high-handed deal, learned through one of their confederates who was in Washington of the action of the Club, and proceeded to attempt to wreck the Club and discredit its officers. Inasmuch as the matter was to be investigated by Government agencies, the Club had to maintain secrecy about it even when the people accused deliberately sought to destroy the Club.

(8) I have personally heard said Conger and Diffin, whom I have known to be holding the positions of vice-president and treasurer of said American Flying Club, and their confederates, make threats to destroy the said Aero Club of America and to discredit the Club's officers, and I hold, and will submit at the proper time the evidence that they knowingly and maliciously caused the circulation throughout the United States and abroad of malicious and untrue reports and allegations regarding the standing, activities and membership of the Aero Club of America, for the purpose of discrediting and wrecking the latter and destroy possible sources of evidence of the misdeeds charged and discussed in the letter from Mr. Bernard M. Baruch already mentioned, a photographic copy of which is appended herewith.

Purpose of Conspiracy is to Prevent Officers of the Club From Giving Evidence to Attorney General and Federal Grand Juries

(9) I have been informed and believe, therefore state that the said Diffin and Conger and their confederates are making efforts to obtain control of the Aero Club of America, or ruin the Aero Club of America and discredit its officers for the purpose of preventing the officers of the Club from giving evidence to the Attorney General and the Federal Grand Juries in the action already stated.

Asked to Join Conspirators to Prevent Re-election of Alan R. Hawley, Admiral Fiske and Wise Wood and Take Control of Club

(10) On a number of occasions said Diffin and Conger called upon me and stated that they and a number of officials of the Manufacturers' Aircraft Association with whom they had conferred, were ready to give large contracts for advertising for three magazines which I own and edit, if I would agree to "not interfere" in a scheme which they stated they and the Manufacturers' Aircraft Association and Howard E. Coffin and several other individuals had under way to prevent re-election of Mr. Alan R. Hawley and Rear-Admiral Bradley A. Fiske, U. S. N., as president and members of the Board of Governors of the Club, respectively, and to oust Rear-Admiral Robert E. Peary and Henry A. Wise Wood as members of the Board of Governors. They stated that in calling upon me they were acting as representatives of a group of powerful interests who had millions of dollars to spend to take control of the Aeronautical Movement as a whole, and Diffin stated: **"We are going to 'break' the Club and any other organization and individual who stands in our way."**

Asserted Arrangements Had Been Made to Whitewash Coffin

Said Conger and Diffin told me, and an individual who acted as their representative whose name and address will be revealed at the proper time told other members of the Club that Howard E. Coffin was the leader of this scheme to take control or wreck the Club. They stated further in a most arrogant manner that the "powerful interests" referred to had **"already arranged to have Howard E. Coffin 'whitewashed' of the charge of maladministration of the billion dollar aircraft program and anyone who doesn't like it and opens his mouth had better watch out."**

Having had more or less to do with Mr. Coffin on aeronautic and national defense matters since 1915, and having approved his nomination as a member of the Board of Governors in 1916, I felt very much concerned about these statements and telegraphed to him at Detroit advising him of the statements made by Conger and Diffin and their representative. **Mr. Coffin answered by telegraph, requesting me not to take any action until I had conferred with a S. S. Bradley, general manager of the Manufacturers' Aircraft Association, the organization whose methods had been condemned by the U. S. Senate Investigating Committee as "vicious and designed to reap large profits by taking advantage of the necessities of the Government."** In view of the fact that this Association was accused of serious violations of the statutes and of vicious unpatriotic irregularities, and I was at that time preparing a report on the situation at the request of the Senate Investigating Committee, I declined to communicate with said Association. Later Mr. Coffin wrote to the Board of Governors of the Aero Club of America that his name had been used by said Diffin, Conger and their confederates without authority, thereupon the latter produced a letter from Mr. Coffin apparently authorizing them to use his name.

A number of other prominent men complained to the Board of Governors and to active officials of the Club that their names had been used without authority or knowledge and against their will by said Diffin and Conger and their confederates.

Sought Aid to Have Government Aeroplanes Costing Over $100,000,000 Destroyed

(11) I am informed and believe and have evidence to the effect that some of the confederates of Diffin and Conger are individuals who sought at various times to secure the approval and support of officials of the Aero Club of America in schemes intended to cause the Government officials to believe that military and naval aeroplanes which cost over one hundred millions of dollars were unsafe and cause the Government to destroy these valuable aeroplanes, so that they could obtain large orders for new aeroplanes and unwarranted subsidies. **An officer and agent of the Manufacturers' Aircraft Association who wanted the Aero Club of America to recommend the burning of Government aeroplanes which had cost over $100,000,000 called on me. He stated that Mr. Howard E. Coffin and others were favorable to the scheme. He claimed that the aeroplanes were unsafe. In answer I told him that if they could prove that these aeroplanes which had been produced for the training of the twenty thousand American aviation students in the United States and several thousand American aviators overseas, and for the protection of the two million American soldiers overseas, and for winning the war; if he could produce evidence that such a crime had been perpetrated against the American people, then I would urge burning the aeroplanes, but would also urge hanging the guilty parties as traitors.** This propaganda to have the aeroplanes burned lasted until the indignation caused by the published report of the burning of a large number of aeroplanes of the American Expeditionary Forces showed that the American public would not permit such a wanton destruction of aeroplanes which had cost over one hundred million dollars.

Officer Became Antagonistic Because Club Would Not Urge Large Appropriation Without Definite Budget

(12) I am further informed and believe, therefore state that other confederates are individuals who sought the assistance of the Club or its officials for schemes to obtain unwarranted Government subsidies. Among the confederates who are assisting said Diffin and Conger are also some individuals late officers in the U. S. Army Reserves who while serving in the Army reserves sought to make officers of the Aero Club of America approve, support and urge certain appropriations and measures which said officials of the Club did not consider to be to the best interests of the country and, therefore, they refused to do so. Thereupon two of these individuals are known to have discussed schemes for ousting said officials from the Aero Club of America, and I am informed and believe, therefore aver, have stated that they would ruin the Aero Club of America, if necessary to attain their unlawful ends. As part of the evidence supporting this statement.

(13) I append herewith a statement from and signed by Mr. Wm. H. L. Howard, representative of the Club in Washington, confirming in writing reports which he made orally to myself and other officers of the Club in April, 1919.

Want to Suppress Evidence of Attempts to Burn Aeroplanes That Cost $100,000,000

I have substantial evidence to support my belief that by causing the Aero Club to go into bankruptcy and discrediting its active officials some of these individuals are seeking to discredit and ruin financially some of the active officials of the Club, for the purpose of eliminating them as possible witnesses in the expected investigations by the Attorney General of the attempts to cause the destruction of Government aeroplanes costing over $100,000,000, obtaining large sums of public funds by misrepresentations and in violation of specific provisions made in laws enacted by Congress, and other similar selfish and unlawful purposes.

Plan to Cause Aero Club to Bankruptcy

(14) I am further informed and believe, and have evidence that indicates, and therefore I state that these schemers referred to above have enlisted the sympathy of several members of the Board of Governors of the Aero Club of America who have heretofore been inactive in Club affairs, and are not aware of the evil purposes of the schemers, and have pledged themselves secretly and unlawfully, and without advising, consulting and receiving the approval of all the members of the Board of Governors of the Aero Club of America, and in violation of the constitution and by-laws of said Club, to enter agreement with the said American Flying Club, whereby the Aero Club of America assumes large financial liabilities and responsibilities of the American Flying Club which will wipe out and dissipate the present Treasury Surplus of the Aero Club of America and will cause the Aero Club of America to go into a state of bankruptcy whereupon, I am told, the Manufacturers Aircraft Association which holds bonds issued by the American Flying Club, which they are seeking to make the Aero Club of America assume, will have financial control of the Aero Club of America.

Three Club Officials Planned to Resign

(15) Further, the evidence shows that the said few individual governors who are not familiar with the conspiracies impending against the Aero Club of America, and who have so pledged themselves secretly and unlawfully to cause the Aero Club to enter into an agreement which will cause it to go into a state of bankruptcy, have also secretly agreed to resign as officers of said Aero Club simultaneously with their turning over said Aero Club to the Flying Club, so as to escape the responsibility for the financial liabilities caused by their unlawful and destructive action.

Manufacturers Aircraft Association Claimed to Have Government Approval

(16) I have been advised and believe, that to gain the support and sympathy of these few gentlemen, the individuals who are seeking to destroy the Aero Club have told them that the Manufacturers Aircraft Association is an organization representing the whole of the aeronautic industry and approved by the Government. These statements are false and **I will submit evidence at the proper time to prove that most of the firms who were members of the Manufacturers Aircraft Association discontinued their activities since the signing of the Armistice and their place in the aeronautic industry has been taken by several hundred of other firms who are not and refuse to become members of the Association. I will also submit evidence that the Association's claim of Government approval is based on misrepresentations which are being investigated by the Department of Justice.**

(17) That the said few Governors of the Club who are in sympathy, because of their lack of knowledge of the facts, with this scheme to ruin the Aero Club of America, number less than ten out of close to three thousand officers and members of the Club and that their acts have been secretive and in violation of the purposes and provision of the Constitution and By-laws of the Aero Club of America.

(18) That Mr. Charles Jerome Edwards, the Acting President of the Aero Club of America, on Wednesday, July 14th, 1920, at a meeting held at the Aero Club House, No. 297 Madison Avenue, Borough of Manhattan, City and State of New York, told deponent and Messrs. Alan R. Hawley and Henry Woodhouse that two of the members of the Flying Club Committee authorized to deal with the Aero Club regarding the proposed amalgamation **are George H. Houston, an officer of the Manufacturers Aircraft Association, which was publicly condemned in a report by the U. S. Senate Investigating Committee as "vicious and designed to reap large profits by taking advantage of the necessities of the Government" and another member is an individual engaged in commercial aeronautic patent litigations for Mr. Houston in which the Manufacturers Aircraft Association is interested. Therefore the proposed amalgamation would bring the Aero Club of America within the undesirable influence and control of the said Manufacturers Aircraft Association and would end its existence as a national, moral force; and that it would also end its usefulness as a national organization whose opinion is sought and considered and followed by Congress and by the press; and that it would also end its existence as a sporting organization having an enviable international record for the highest of attainments in the field of sport.**

Manufacturers Aircraft Association Holds Flying Club Bonds

(19) That inasmuch as the American Flying Club sold bonds to the Manufacturers Aircraft Association, which would be held by the said Association until redeemed and retired by the Aero Club of America, as provided for in the project outlined in the said letter of the said Acting President of the Aero Club of America; and whereas the Aero Club of America has not now and would not have after assuming the said liabilities of the said Flying Club, the sur-

(*Continued on page* 720)

THE NEWS OF THE WEEK

Plan to Map New York By Aeroplane

New York. — With the announcement that $20,000 will be asked of the Legislature to conduct New York's part of the United States geological survey this year, information has been received by State Engineer Frank M. Williams that the Federal authorities are seriously considering utilizing aeroplanes in revising the topographic maps.

Mr. Williams has already directed the division engineer in the eastern, western and middle divisions of the State to start relocating the features on the maps where changes have already been made as a result of the construction of the Barge Canal. There are many sections in the State where conditions have changed since the survey has been made, and it is believed that at these points the most economical method of revising the topographical maps is by means of aerial photographs.

A. C. Birdseye, Chief Topographic Engineer of the United States Geological Survey, says that the greatest problem connected with the aerial survey is that of obtaining a sufficient number of aviation fields and landing stations. It is imperative before the authorities set out to make the airplane survey that the stations be properly distributed so that it will be possible to reach all sections to be covered.

In the case of New York survey eight or ten stations will be established, or one to every 6,000 to 8,000 square miles.

The estimated cost of photographing, revising and printing the photographic maps in editions of a thousand copies has been placed at between $5 to $10 per square mile, but this can be reduced as the work progresses.

Will Stump in Aeroplane

White Plains, N. Y.—George J. Werner, of Rye-on-the-Sound, Republican candidate for Sheriff of Westchester County through designation by the Republican organization, will stump the county in an aeroplane.

Military Academy in California to Study Aeronautics

Realizing that to be abreast of the times necessitates the utilization of aircraft, the Pasadena Military Academy will shortly present its students with a comprehensive course in aeronautics.

In accordance with their plans along this line, Mr. E. S. Wallace, assistant superintendent of the academy, has visited the Naval Air Station, Cal., to ascertain the possibility of procuring the requisite aircraft equipment from the surplus stock of the Navy.

This is possibly the first attempt in the west of a military academy inaugurating a course in aeronautics in conjunction with the regular studies.

Seaplanes in Lumber Service

Quebec.—One of the largest lumber firms, whose timber limits cover an area of more than 8,000 square miles scattered throughout the eastern part of the Province of Quebec, has secured seaplanes to act as patrols and obtain aerial photographs. This air service will be staffed entirely with officers of the Royal Flying Corps.

Three Balloons Lost in Fire

Akron, Ohio.—A dirigible balloon, the D-1, belonging to the United States Navy, and two balloons owned by the Goodyear Tire and Rubber Company were destroyed recently with a loss estimated at $160,000 by a fire which broke out in a hangar at Wingfoot Lake. Origin of the fire is not known.

Plan State Aero Meet in St. Paul

A State aeronautical convention is being arranged in St. Paul, Minn. W. B. McElveny, secretary and treasurer of the St. Paul Aero Club, announced the appointments of Major W. C. Garis and T. Glenn Harrison as St. Paul club representatives on a general committee. They will confer with representatives of the Minneapolis club and other similar organizations to decide on a date.

Mr. and Mrs. S. E. J. Cox, and Seymour Jr., enthusiastic boosters of aviation in Texas. "Jack London," the dog, has made many flights

JL-6 Monoplane Delivers Yacht Race Photos

A JL-6 all metal monoplane made a meritorious flight on July 17th from Central Park, Long Island, to Springfield, Mass., carrying photographs of the yacht races for America's Cup taken that day. While there the all metal machine attracted great attention and succeeded in doing remarkable aviation missionary work over the New England area.

The yacht race pictures had been taken in the afternoon by both motion and still camera men from another JL-6 equipped with pontoons.

After the camera men had finished their work, Pilot Bert Acosta flew back to the Larsen airport at Amityville, L. I. From there the pictures were rushed by automobile to the Central Park Flying Field.

At 5:11 P. M. the photos were put aboard another JL-6 and Pilot S. C. Eaton headed the machine for Springfield, Mass. With him in the pilot's cockpit was C. H. Warner, manager of the Larsen Flying Field. In the cabin were Miss Florence Parbury, noted English artist, and W. W. Williams.

It was 6:31 P. M. when Pilot Eaton landed at the new Springfield airport. A large number of the population turned out to see the arrival of the speedy metallic plane. The photographs were rushed to the office of the Springfield *Union*, where they were developed, and some were sped to Boston.

City officials, business men, financiers, and Chamber of Commerce officials from half a dozen cities inspected the plane and flew in it.

On July 19 Pilot Eaton flew to Framingham, where a landing was made on the army field. The trip, made at low altitude, because of haze, took just 38 minutes. Lieut. Col. Drennan, Commandant of the army field, with his staff, gave the aerial voyagers a hearty welcome.

The party had been added to at Springfield by Mr. and Mrs. S. A. Terhune, Jr. The fact that passengers had been able to read and smoke while in the air made a big hit with Boston newspapermen, who before had hardly appreciated the advantages of the Larsen all-metal monoplane.

While at Framingham the plane was inspected and many flights were enjoyed by a number of Boston's Councilmen, city officials and others.

One result of this trip and inspection is that Boston may have a real airport in the heart of the city, on the strandway, South Boston, within a few minutes of the centre of the city. At present Boston has no safe landing place within the city. Another result is predicted, that several air lines will probably be established soon to run a regular passenger, mail and light package express business between Boston and other cities.

On July 21 the JL-6 was flown back to New York. The trip from Boston to Central Park, approximately 260 miles by the route followed, was made in 130 minutes. Mr. W. N. Stiles, vice-president of the Eastern Aircraft Corporation, and his wife, replaced Mr. and Mrs. Terhune on this leg of the trip.

Alturas Buys Landing Field

Alturas, Cal.—Citizens of Alturas have purchased a new aeroplane landing field. It contains 45 acres. Forest Service fire patrol planes will also use the field.

Landing Field at Oklahoma City

A good landing field has been established at Oklahoma City, Oklahoma, and it will be a municipal aviation field. Captain Bradley of the Army Air Service inspected the field and notified the Oklahoma City Chamber of Commerce that it was very suitable for an aeroplane landing field, and made a few suggestions for improving it, which were immediately acted upon.

Aerial Police Carry Tear Bombs

Springfield, Mass. — Springfield's "sky policemen" will carry tear bombs as part of their equipment in fighting disorder in that city. These bombs are similar to those used during the war and render the most violent persons helpless.

Edward A. Terhune, Jr., one of the new aerial policemen, flew from South Boston and landed on the banks of the Connecticut River, where the new 3,000-acre aerodrome is located. On his arrival, together with Wesley L. Keough and Frank De Costa, he took oath.

Fire patrol duty and the pursuit of auto bandits will also form part of their duties.

N. Y. Aerial Police at Yacht Races

The aerial police of New York City got into action for the first time at the yacht race. Col. Herbert Mapes, acting commandant of the aerial police force of the city, watched from the destroyer Semmes land planes and other aircraft persistently violating the rules concerning the maintenance of an altitude of 1,000 feet and a horizontal distance of 500 feet from the contending yachts. They also were flying dangerously low over excursion steamers out to see the race.

Not having an aeroplane handy to chase the offenders himself Col. Mapes got busy otherwise. He sent a radio to Col. G. C. Brant, air service officer of the Department of the East at Fort Schuyler.

Having thus disposed of future infringements by army planes Col. Mapes got after the civilian fliers. In another radio message to C. N. Reinhardt, general passenger agent of Aero Ltd., at Flushing Bay, aboard aerial flagship No. 5, he requested that the flying boat communicate with him on the Semmes as soon as possible. Harry Rogers, who piloted the flying boat recently from Miami, Fla., to the city in a day, hopped on board the boat, took off hastily, and within a few minutes had flown from Flushing down the East River and harbor to the yacht race. He flew low over the destroyer and easily got into radio communication with his chief while in the air.

The army and civilian planes soon ceased their stunting and low flying.

National Safety Council to Investigate Aviation Hazards

Atlantic City.—The Executive Commission of the National Safety Council at a meeting at Atlantic City, N. J., authorized creation of a committee to investigate aviation hazards.

H. M. Wilson of Hartford, Conn., was appointed Chairman with authority to select his associates. Men familiar with all phases of aeronautics, including manufacturers and engineers, will sit with the committee. The action, it is announced, is due to the fact that commercialization of aeronautics has reached a point in what now appears to be a safe and sane development where it is imperative that grave consideration shall be given to this method of travel and transportation with respect to the hazards pertaining to those upon the ground as well as to those who journey by air.

Aviation Field at Albany Almost Ready

Albany, N. Y.—The Quentin Roosevelt flying field at Albany, N. Y. will be completed and ready for aviators soon, according to officials of the Chamber of Commerce. This new field is located in the southern section of the city on the banks of the Hudson river.

An aerial exhibition greater than any ever witnessed in Albany will mark the opening of the field. The field is a mile long and half a mile wide and will accommodate 150 machines. A steel hangar is to be installed by the war department. The entire field is outlined by a broad white line and a huge white cross 150 feet across will afford a guidance for aviators in the air. There will also be signal lights provided and facilities for the landing of flying boats and their removal from the water.

Evansville Aero Club Promoting Aviation

Since its organization, the Evansville Aero Club, of Evansville, Indiana, has placed the community on the map by securing and maintaining an aviation field. Besides the forty acres in the field on the Little Green River road, the club has since purchased an additional forty acres adjoining the original tract which is used as the landing field.

P. P. Carroll is president of the Aero Club and E. H. Hyman secretary. Other members are Henry C. Murphy, Howard Roosa, Ray Graham, Samuel L. Orr, Joseph Graham, Samuel L. May, R. A. Andres, Robert Graham, Charles B. Rudd, A. V. Burch, T. C. Hutchinson, Richard Rosencranz, F. Harold Van Orman, Morton Mannheimer, A. Strouse, Louis Nagle, A. M. Dawson, F. G. Richardt, Theodore Bitterman, Ben Bosse, Frank Schwegeman and D. W. Blymyer.

Pioneer of Oregon Trail Flies Over Route He Covered With Ox Team

Spokane, Wash.—Sixty-eight years ago, traveling by ox team at two miles an hour, Ezra Meeker, now ninety years old, came from a point near Lewiston, Idaho, to Spokane in six days, when blazing the now famous Oregon trail. A few days ago, in an aeroplane piloted by Lieut. N. B. Mamer of the United States Aircraft Corporation, the pioneer made the same trip in eighty minutes. And he refused an offer of assistance in climbing out of the plane.

"I came through here before Washington was even a territory," said the aged pioneer, "and, as far as I can determine, I am the only one of that day living now. I left the Missouri River May 19, 1852, and got to Portland in October. My wife and six-year-old son were with me in the old prairie schooner. Two miles an hour and about sixteen miles a day was about the speed we made."

Aerological Service at Panama Canal

Aerological Service which will be of much convenience to ships operating in the vicinity of the Panama Canal is being extended by the Navy's Aerological Section. With the opening of the new Navy radio station at Cayey, San Juan, and the assignment of aerological officers to Coco Solo, C. Z., and Santo Domingo, plans are now complete for the transmission of all Caribbean reports by radio to Washington and to Coco Solo and Santo Domingo. Further arrangements are being made to have reports from Bluefields, Nicaragua, and Swan Island transmitted to Coco Solo, and in addition to have the meteorological service of the Canal Zone, which is under the Canal Commission, take on and transmit such additional observations as needed for aviation operations in the zone. Coco Solo will also arrange to have ships passing through the canal transmit weather reports from the Caribbean and Pacific after leaving the canal.

Ashmusen Aeronautical Co. Service Station at Omaha

The Ashmusen Aeronautical Company of Omaha, Nebraska, is operating an aeroplane service station and has just completed repairing two DH4 aerial mail planes. The factory of the company is located opposite from the Aerial Mail Field, and the hangar is used for repairing all aeroplanes and for storage of transient machines.

The service station is completely equipped to supply oils, high test gasoline and all supplies for aeroplanes and motors. Repairs can be made very quickly, skilled mechanics being on hand for any kind of work on aeroplanes. The field and factory is located about two miles west of Omaha.

All aviators crossing the continent by way of Omaha are invited to land there, and can be assured of careful attention. During the trans-continental flights, the government used the Ashmusen hangar, and found the service excellent. The field is a very good one and all transient pilots will be welcome.

Flying Field and Hangar of the Ashmusen Aeronautical Company at Omaha, Nebraska

The AIRCRAFT TRADE REVIEW

N. E. J.

Congress May Pass New Metric Law

Adoption of the metric system as the exclusive legal standard in the United States is predicted as one of the first acts of the Congress to convene next December following agitation for its use all over the country.

Announcement at the White House that more than 100,000 petitions have been received from manufacturers, engineers, exporters, professional men and scientists urging such legislation, the city council of Chicago unanimously indorsed the metric system.

The city of Chicago by reason of the great engineering, business and health activities—yearly amounting to many millions of dollars—is vitally interested both as a municipality and in behalf of its citizens in the speedy adoption of a simple world-wide uniform standard of weights and measures, declares the resolution adopted by the city council.

Farman Two-Passenger Sport Plane Wins Grand Prize

Word has just been received from France, by W. Wallace Kellet, representative of the Farman Aeroplanes in America, that a two-seater Farman sport type aeroplane had won the Grand Prize in a low and high speed contest at Billancourt, France. The machine established a world's record when it flew at an official minimum speed of 15⅝ miles per hour, and at an official maximum speed of 87 miles per hour.

The Farman two-seater sport plane is undoubtedly a wonderful machine, and will prove very popular on account of its low landing speed. This is another record added to the many already won by Farman aeroplanes.

Silencer for Aeros Invented by Swiss

Geneva.—The invention of a silencer for aeroplane engines, more highly developed than an automobile muffler, is announced by a Swiss aeroplane firm.

The noise of the motor is completely silenced, and the invention is of great importance from a military and commercial point of view.

Resistal Awarded Underwriters' Label

After a most comprehensive and exhaustive series of experiments and tests, physically, chemically and under conditions of service of great severity, the Underwriters' Laboratories have officially approved Resistal Goggles manufactured by Strauss & Buegeleisen of Brooklyn, N. Y.

A full report of the work of the Laboratories on Resistal Goggles was made to the Casualty Council of the National Board of Fire Underwriters, which has approved its findings and recommendations.

The tests made included the drop-test, the famous hammer test for non-shatterability, the boiling test for permanent lamination, the clear vision test for visual acuity, service tests for comfort, besides other tests, including all those prescribed by the tentative code of the U. S. Bureau of Standards.

The regular Underwriters' Laboratories inspection service is being carried on at the Strauss & Buegeleisen factory by a resident representative of the Board, who inspects the progress of manufacture, the materials used and the finished Resistal Goggles.

Every goggle which passes this inspection is given the Underwriters' Label, thereby placing it, from a standpoint of safety engineering, in the same class as all other labeled articles, such as fire extinguishers, electrical devices, sprinkler systems, etc.

About two years ago Resistal Lenses were officially endorsed by the U. S. Bureau of Standards in a report. Now the approval officially by the Underwriters' Laboratories gives the Resistal Goggles an enviable standing with those who seek the best in eye protection devices, and who realize what the weight of this impartial endorsement and approval means.

New Type Parachute a Success

A new parachute has been devised and successfully tried out by Walter T. Varney at Redwood City Field, California. Varney and his associates made jumps at altitudes of from five to ten thousands feet and in each case the parachute has opened with a drop of less than thirty feet.

The new parachute is made of the lightest silk and with its equipment weighs but six pounds. It is strapped to the back of the aviator or passenger and absolutely assures a safe landing in any emergency. The speed of the parachute is never more than five miles an hour and consequently it requires no skill on the part of the passenger in maneuvering.

The new Varney parachute was demonstrated publicly for the first time at the Aviation Meet at San Jose.

This parachute, unlike the many others that have been used in connection with aviation, makes it safe to jump even from a height of one hundred feet or under, as it is guaranteed to open within thirty feet.

New Members of Curtiss Organization

W. W. Mountain, for the past year vice-president and general manager of the Curtiss Aeroplane and Motor Corporation, has resigned to devote his attention to the Mountain Paint and Varnish Works, Toledo, Ohio, of which he is president. A. V. Crary, formerly district sales manager for the American Can Company, Chicago, Ill., has been appointed general sales manager, and H. P. Meredith, formerly connected with the Du Pont and General Motors interests, has been appointed manager of manufacture. R. W. Moore, former assistant general manager, has been made general business manager, and F. H. Russell, former general manager of the Curtiss Engineering Corporation, and Maurice Connolly, former general sales manager, are now special representatives of the company.

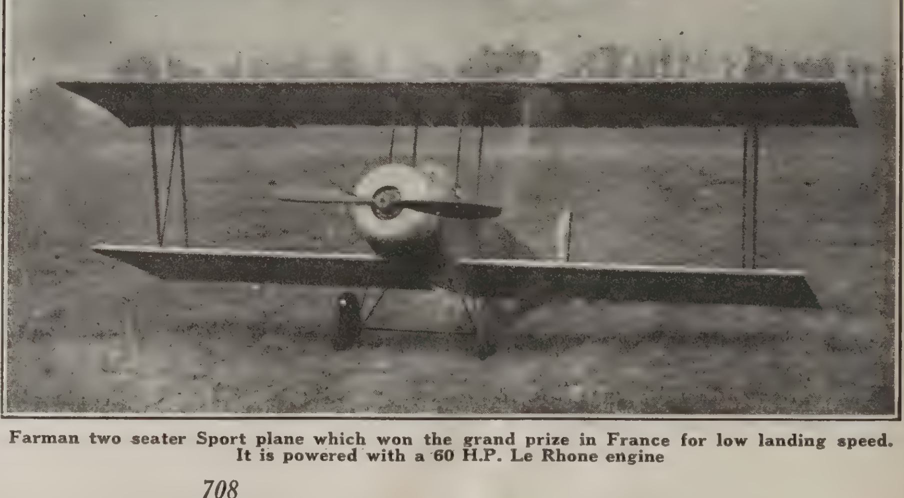
Aero Service Between Sea Bright and New York

Sea Bright, N. J.—A permanent aircraft station is to be established between this place and New York City. The preliminaries, such as purchasing land and a passenger station, have been completed. The landing sight will be the old Hotel Stockton property, 200 by 600 feet, just north of the Sea Bright railroad station.

Aeroplanes will carry passengers from Sea Bright to New York in twenty-two minutes. The company will also take sightseers to such events as the yacht races. The company has ten seaplanes, one carrying twelve passengers and the others seven each. Regular trips will be maintained between Sea Bright and New York.

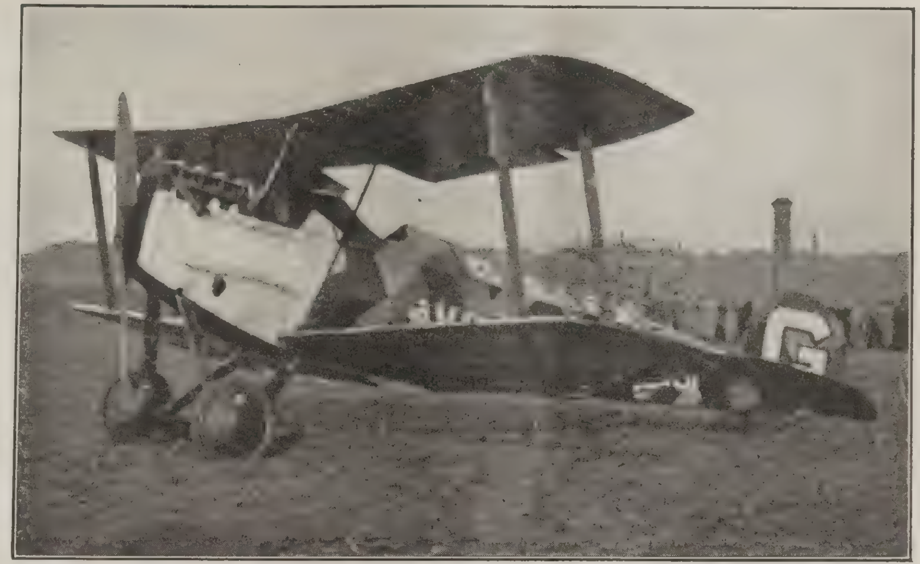
Personal Par

Mr. Norman Bell has been made assistant sales manager for the Norma Company of America, this appointment following a connection of over three years with the concern as sales engineer. Mr. Bell's training and experience in the mechanical and automotive fields includes a former association with a leading British manufacturer of motor cars and nearly four years in charge of the motor accessories department of the Lunkenheimer Company of Cincinnati.



Farman two seater Sport plane which won the grand prize in France for low landing speed. It is powered with a 60 H.P. Le Rhone engine

THE AVRO "BABY" SPORT BIPLANE



The Avro Baby, with 35 H.P. Green Engine

AMONG the many popular aeroplanes in England to-day is the famous little single-seater sporting biplane known as the Avro "Baby." This little plane, equipped with a 35-40 horsepower Green engine, has made several remarkable performances, the most recent being the wonderful non-stop flight from London to Turin, Italy, 650 miles in 9½ hours, using only 20 gallons of petrol.

Constructionally the machine follows standard Avro practice. The fuselage, of rectangular shape with an arched deck fairing, is of the conventional built up type. Longerons and struts are of spruce and the bracing of steel wire.

The pilot's cockpit is very roomy and the seat is of the aluminum bucket type with an upholstered cushion. A padded head rest is provided, and the deck fairing behind the pilot contains a small locker for carrying small articles such as spares, etc.

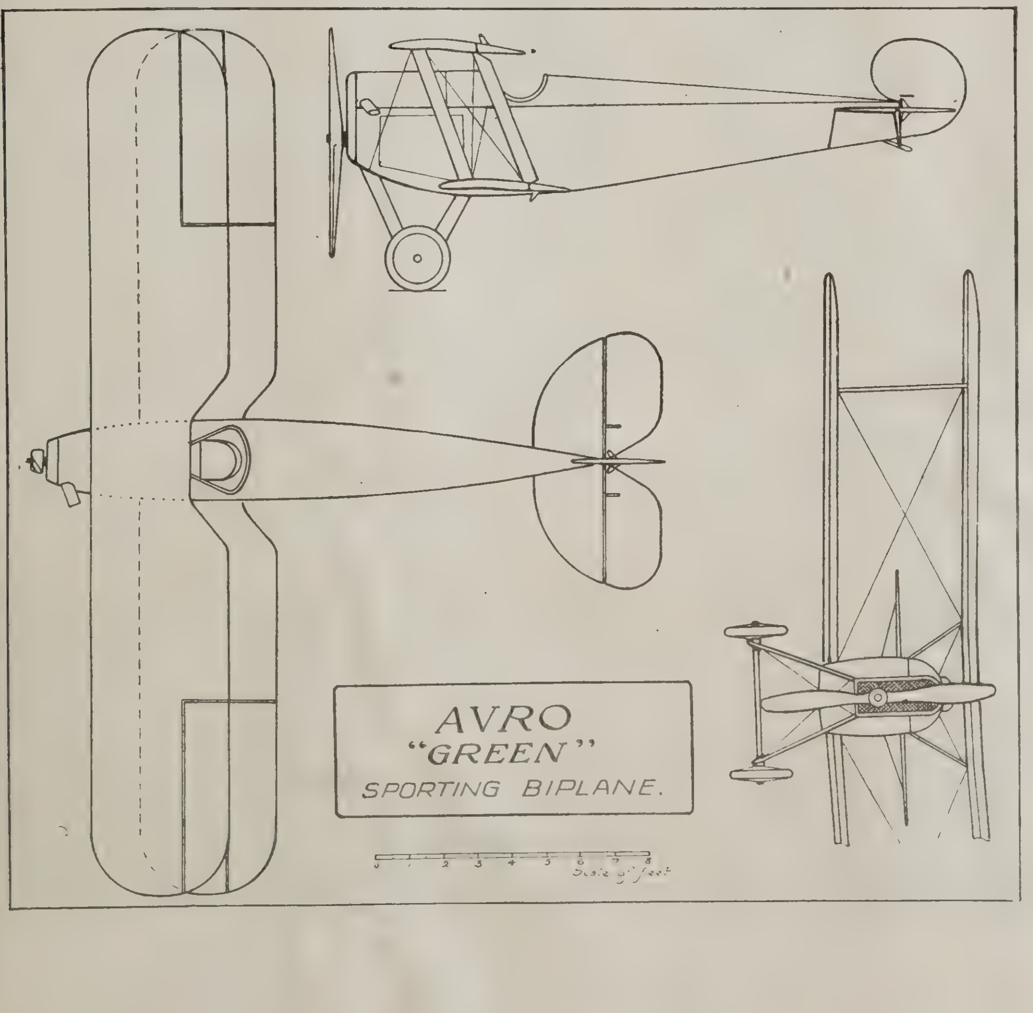
The deck fairing in front of the pilot is so arranged that, while giving a good view, it deflects the air from the pilot's face, making it unnecessary to wear goggles in flying the machine. A folding wind-shield is provided.

The controls are of the standard type, a foot bar for rudder control, and a universally mounted steel tube for elevator and aileron controls. As the control stick is mounted at its base, the elevator control cables pass around pulleys mounted on the foot-bar support and then to the elevators. The aileron cables pass over universally-jointed pulleys, to the crank levers.

A large instrument board with a complete set of instruments, including tachometer, altimeter, air-speed indicator, water thermometer, oil pressure gauge, cross level, clock and engine switch, is mounted conveniently in the machine.

The landing gear is of the V type, with struts of circular section steel tube, streamlined with fairings, which are covered with linen. The axle is divided, hinged in the center, and supported by rubber shock absorbers. The tail skid, made of ash with a steel wearing shoe, is held by rubber shock absorber cord.

The main planes are of good design and construction. The lower planes are attached to the sides of the fuselage, and the two halves of the upper plane are secured to a center section which is held by four struts raked from the fuselage. There is only one pair of interplane struts on each side. These struts are of wood, and the four center section struts of streamline steel tubes. The landing wires are of usual arrangement, but the flying wires are arranged in an unusual manner. The lift wires, four in number, form a letter M, the two top points being secured to the top of the interplane struts and the three lower points are attached to points on the fuselage, thus distributing the lift over a considerable length of the body. The internal drag bracing of the wings is relieved of some of its load due to the angularity of the wires.



The main wing spars are of built-up box section, and the ribs are of the wood girder type, with box girder ribs taking the compression load. Ailerons are fitted to both top and bottom planes, and the upper and lower flaps are connected by wires. The tail plane and elevators are of graceful shape, and the rudder is of the usual Avro shape.

The power plant, as mentioned before, is a Green four-cylinder vertical, water-cooled, 35-40 hp. engine. The engine-bearers of wood are mounted on transverse supports bolted to stout struts in the nose of the fuselage. The radiator, of honeycomb type, is mounted on the nose. The petrol tank contains eight gallons of petrol, sufficient for a flight of over 200 miles. The engine is cowled in neatly by aluminum cowling, with large inspection doors. All engine controls are of positive pull and push rod type.

The performance of this machine is excellent. The horizontal speed near the ground is 78 miles per hour and the landing speed 32 miles an hour. Climb to 1,000 ft., 1 minute, 40 seconds; to 3,000 ft., 6 minutes. The petrol consumption flying near the ground is 3.5 gallons per hour, with engine running full speed.

Specifications of Avro "Baby"

Span of wings	25 ft.
Length, over all	18 ft. 6 in.
Height	7 ft. 6 in.
Weight, empty	625 lbs.
Weight, loaded	857 lbs.
Useful load	232 lbs.
Load per sq. ft.	4.75 lbs.
Load per hp. (at 40 hp.)	21.4 lbs.
Total area of main planes	180 sq. ft.
Area of rudder	9 sq. ft.

THE STRUCTURAL ANALYSIS AND DESIGN OF THE AEROPLANE

By B. C. BOULTON

In Charge of Stress Analysis and Structural Design, McCook Field

FOREWORD:

With the close of the Great War another era in the development of the aeroplane has begun. To the present time the demands of war have caused the energies of aeronautical engineers and designers to be devoted exclusively to the evolution of the plane as a weapon of warfare. Specialization has brought this type of machine to a state of remarkable efficiency and complexity in which perfection and refinement of detail have been strongly emphasized. While in the future the evolution of the military aeroplane will continue, the attention of designers will bring about two divergent types: The relatively small and inexpensive plane for personal business or pleasure, and the large multi-motored machine for special passenger, mail and limited express service.

It is impossible to foresee what restrictions practical considerations will put upon the latter type with respect to size and weight, but, whether the limit is ten or fifty tons, there will be an unceasing fight for strength against weight that will require the most efficient utilization of material. Many can construct an aeroplane of great strength and weight, but only an engineer can design one in which every unnecessary pound of wood and steel has been eliminated. No longer, as in the pioneer days, can structural members be determined by the eye and judgment. The modern aeroplane in all its various parts is essentially a structure like a bridge or a building, and as such can be accurately analyzed and designed. Not alone in the large type is it important that design be based on accurate analysis, but also in the smaller plane, where the high safety factor, that is needed for a reasonable longevity, tends to make the weight excessive. In the commercial aeroplane, with the substitution of steel for wood construction, that was forced by the necessities of quantity production, problems will arise requiring a knowledge of the principles of analysis. It is evident that such a knowledge is an essential part of the foundation for an intelligent development of the aeroplane. The purpose of the present series of articles is, first, to present, in a simple, concise manner certain fundamental ideas of mechanics and strength of materials, and, second, to show by means of concrete examples how these principles may be applied in a systematic manner to determine the stresses existing in the different parts of the aeroplane under various conditions. In every case the subject will be approached from a sound engineering point of view. Highly theoretical and mathematical methods will be avoided whenever it is possible, in favor of simplicity and clarity. THE AUTHOR.

PRINCIPLES OF STATICS

It is impossible within the compass of a single article to touch upon more than the absolutely essential principles and to briefly illustrate their application. Owing to this limitation of space, the wide field covered, and the inherent dificulty of some of the material presented, it will be necessary for the general reader, if he would receive sufficient knowledge to thoroughly understand the later applications of these principles to the aeroplane structure, to give the article careful study. The whole subject of statics, that part of mechanics dealing with bodies in equilibrium, is based on Newton's first law: Every body continues in its state of rest or uniform motion in a straight line unless acted upon by an outside force. The corollary of this; namely, that if any unbalanced force acts upon a body, the body is given an accelerated motion, states the effect of violating the principles of statics. According to these laws, if a structure, or any part of a structure is in equilibrium the algebraic sum of all the forces acting upon it must equal zero. If each external force acting upon the body is now resolved into two components at right angles to each other and each parallel to one of two rectangular axes, then by this law the sum of all the components parallel to the X axis must equal zero; likewise, the sum of all the components parallel to the Y axis must equal zero. If all the forces are not in the same plane or parallel planes, they must be further resolved into a third component parallel to the Z axis, which is perpendicular to the plane of the X and Y axes. These conditions may be briefly expressed by the equations: $\Sigma Y = 0$, $\Sigma X = 0$, and $\Sigma Z = 0$, in which X, Y and Z denote the components of those forces parallel to the X, Y and Z axes, and Σ denotes "the sum of". As forces frequently lie in a single vertical plane they are resolved into horizontal and vertical components, and the law of equilibrium is commonly expressed by $\Sigma H = 0$ and $\Sigma V = 0$.

When the forces acting upon a body do not intersect at a point, if the body is to remain in a state of equilibrium another condition must be fulfilled; namely, that the algebraic sum of the moments of the forces, about any axis perpendicular to the plane in which they act, must equal zero, or $\Sigma M = 0$. These, then, are the three fundamental equations of statics: $\Sigma H = 0$, $\Sigma V = 0$, and $\Sigma M = 0$.

Care must be taken in problems to give each force or moment its proper sign. The following convention is in general use: forces acting to the right are positive, those to the left negative; forces acting up are positive, those acting down negative; clockwise moments are positive, anti-clockwise moments negative. It should also be noted that a force has three characteristics—magnitude, direction, and point of application.

The stresses in any statically determinate structure can be calculated by various applications of the equations just given. Statically indeterminate structures are much more complicated. Two of the most useful methods for solving such cases will be discussed later in the articles. Two general methods of solution for determinate structures may be followed, either the analytical or the graphical. Frequently a combination of the two is most convenient. The analytical solution will be taken up first.

The Solution of a Warren Truss

A truss is a structure, built up of members so arranged that they are subjected primarily to direct tension or compression, which transmits loads imposed upon it to the two or more points at which the truss is supported. If there are more than two supports, the truss is termed continuous. This type will not be considered here. Trusses are assumed to be in a single plane, which is usually that of the forces acting upon the truss. In calculating the stresses in a truss it is assumed that the truss is "pin-jointed". By this is meant that at their points of intersection the members are secured by a pin upon which they are free to turn. This condition seldom or never occurs in practice, but the error that is made by the assumption is small. One important conception results from this assumption; namely, that any stress or load which goes into a member at a joint must act in the direction of the axis of the member. No stress can be applied to a member except at a joint. The stresses acting at each end of a member must be equal, and may each be considered as a single force. Such a member is known as a "two-force" member", shown in Fig. 1.

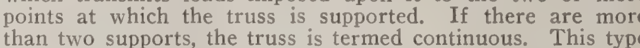


Figure 1. Two force member

The first step in the solution of a truss is the determination of the known external loads upon the structure. These should be shown upon a line sketch of the truss, together with their direction and point of application (see Fig. 2). This done, it is customary to solve for the supporting forces or reactions. The three equations of equilibrium, $\Sigma V = 0$, $\Sigma H = 0$, and $\Sigma M = 0$, which must be satisfied, enable us to learn three things about the reactions. As each of the two reactions has three characteristics—magnitude, direction, and point of application—three facts and only three must be given if the structure is to be stable and statically determinate with respect to the external forces. Generally, the points of application of both reactions, L_0 and L_2, and the direction of one of them are known. Where rollers are used the reaction is always normal to the supporting surface. The conditions of equilibrium are sufficient to determine the magnitude of each reaction, and the direction of one. Should there be three reactions, or should another condition such as the direction of both reactions be unknown, the structure ceases to be statically determinate. If, on the other hand, only two unknown conditions regarding the reactions exist, the structure is unstable. It is important at the outset to be able to tell whether the supporting forces can be calculated by statics.

The next step in computing the reactions is to take the moments of all the external forces acting upon the structure, including the reactions, about an axis passing through one of the reactions, usually the one whose direction is unknown. Since the algebraic sum of these moments equals zero, the reaction appearing in the equations may be solved for, as it is the only unknown. The horizontal and vertical components of the other reaction can now be obtained by resolving all the loads into their horizontal and vertical components, and writing and solving the two equations, $\Sigma H = 0$ and $\Sigma V = 0$. A check on the calculation of the reactions is obtained by taking moments about the other reaction point. Incidentally, it is frequently much simpler to calculate the moments of the components of forces than of the forces themselves, especially if advantage is taken of the fact that the moment of a force about an axis is the same for all points along the line of action of the force to eliminate one of the components. An illustration of this is given in equation 4, in which the moments of the components H_L and V_L of the left-hand reaction R_L are taken, rather than the moment of the reaction itself, which would be difficult to compute. In this manner the horizontal component, which passes through the axis of moments, is eliminated. In the same way it is much easier to obtain the moments of the two forces at U_2 than the moment of their resultant.

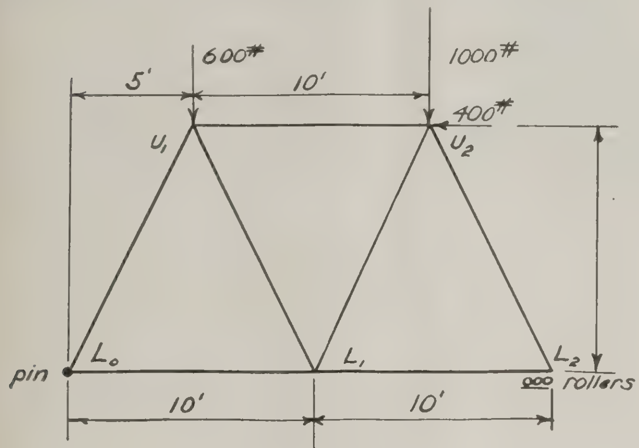


Figure 2. Warren Truss with external loads

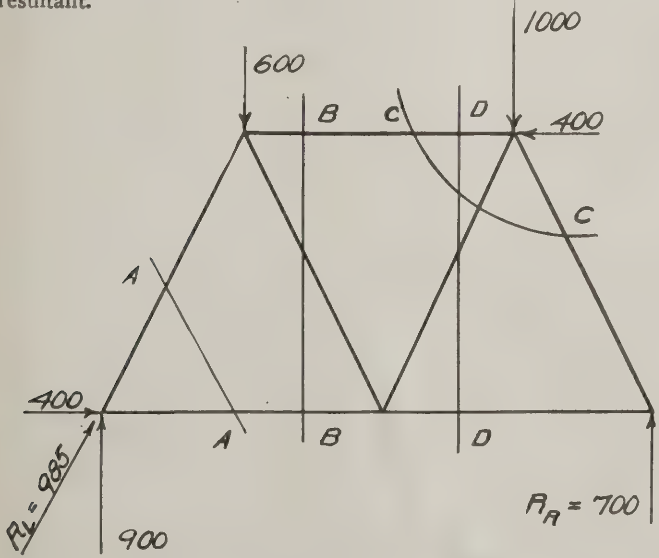


Figure 3. Warren Truss and reactions

Calculation of Reactions for Warren Truss

(1) $\Sigma M_{L_0} = 600 \cdot 5 + 1000 \cdot 15 - 400 \cdot 10 - 20 R_R = 0$

$R_R = +700$ lbs.

(2) $\Sigma H = -400 + H_L = 0$

$H_L = +400$ lbs.

(3) $\Sigma V = -600 - 1000 + 700 + V_L = 0$

$V_L = +900$ lbs.

$R_L = \sqrt{(400^2 + 900^2)} = +985$ lbs.

In Fig. 3 both R_L and its components are shown, but of course the components take the place of the reaction itself.

(4) $M_{L_2} = 20 \cdot V_L + 0 \cdot H_L - 600 \cdot 15 - 1000 \cdot 5 - 400 \cdot 10 = 0$

$V_L = +900$ lbs.

The solution for the stresses in the members may be either analytical or graphical.

The Analytical Solution for the Truss Stresses

The three methods illustrated by this problem, that of joints, of shear, and of moments are but different applications of the three equations of equilibrium. Consider first the joint L_0, Fig. 3, at which there are only two unknown stresses. So far as its equilibrium is concerned, the members $L_0 U_1$ and $L_0 L_1$ may be cut, if they are replaced by the respective stresses acting in these members, as shown in figure 4. By applying $\Sigma V = 0$, in equation 5, the vertical component of the stress in $L_0 U_1$ is obtained. The slope of this member gives the relation between V_1 and H_1, and hence of value of H_1. Equation 7 gives directly the stress in $L_0 L_1$. This process is known as the method of joints. It is very simple and convenient in many cases, but for the more complicated joints it should be used in conjunction with the methods of shear and moments. No joint is capable of solution by this method at which there are more than two unknown stresses. The analytical method of joints is usually simplified by using the horizontal and vertical components of the known forces and unknown stresses. In using the equations of equilibrium for calculating stresses, the sign of the unknown stress or of its components should be written plus. Then the sign that is obtained upon solution of the equation determines the direction of the stress, whether toward or away from the joint, in accordence with the rules previously given. The nature of the stress in a member is thus automatically determined:

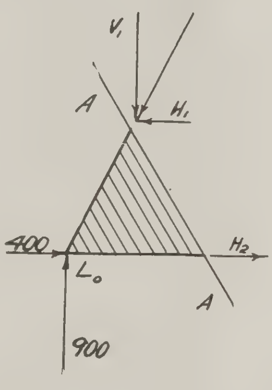


Figure 4. Joint L_0

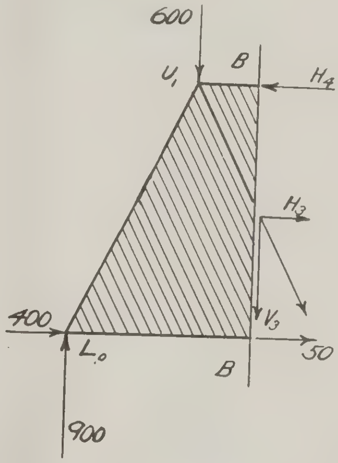


Figure 5. Truss to left of Section B-B

Joint L_0

Solution for stress in $L_0 U_1$ and $L_0 L_4$ by the method of joints.

(5) $\Sigma V = 900 + V_1 = 0$

$V_1 = -900$

(6) $H_1 = V_1/2 = -450$

The stress in $L_0 U_1 = -\sqrt{450^2 + 900^2} = -1006$ lbs. compression.

(7) $\Sigma H = 400 - 450 + H_2 = 0$

The stress in $L_0 L_1 = H_2 = +50$ lbs. tension.

A process frequently used to obtain the stress in the web members of a truss where the chords are parallel is that of shear, illustrated by the solution for the stress in $U_1 L_1$. It consists simply in taking a section through the truss which cuts the two parallel chords and the diagonal in question, and isolating part of the truss, as in Fig. 5. The condition for equilibrium of the vertical forces is now applied and, as V_3 is the only unknown vertical force, its value may be obtained. As before, H_3 is computed from V_3.

Section B-B.

The solution for stress in $U_1 L_1$ by the method of shear:

(8) $\Sigma V = 900 - 600 + V_3 = 0$

$V_3 = -300$

$H_3 = V_3/2 = +150$

Stress in $U_1 L_1 = +336$ lbs. tension.

The condition for equilibrium of the horizontal forces, $\Sigma H = 0$, in Fig. 5, would give directly the stress in $U_1 U_2$. This may also be calculated by the method of moments. In this method a section B-B is taken, and the part of the truss to the left of the section isolated. All the members cut, except the one in which the stress is to be determined, must intersect, in this case at joint L_1, Fig. 6. Equation 9 gives the moments of all the forces acting on the part of the structure under consideration, including that of the stress in $U_1 U_2$. This method is the most useful of the three explained, and should be thoroughly understood.

Section B-B

Solution for stress in $U_1 U_2$ by the method of moments.

(9) $\Sigma M_{L_1} = 900 \cdot 10 - 600 \cdot 5 + 10 \cdot H_4 = 0.$

Stress in $U_1 U_2 = H_4 = -600$ lbs. compression.

As further example of the method of joints and moments the solution for the stresses in $L_1 U_2$, $U_2 L_2$, and $L_1 L_2$ is given, the procedure being the same as before.

Joint U_2

Solution for stress in $L_1 U_2$ and $U_2 L_2$ by method of joints.

(10 and 11) $V_6 = 2 H_6 \; ; V_5 = 2 H_5$

(12) $\Sigma V = V_6 + V_5 - 1000 = 0$

(13) or $2 H_6 + 2 H_5 - 1000 = 0$

(14) $\Sigma H = H_6 + 600 - 400 - H_5 = 0$

Solving (13) and (14) simultaneously $H_6 = +150 \;\&\; H_5 = -350$

$V_6 = +300 \;\&\; V_5 = +700$

Stress in $L_1 U_2 = -\sqrt{150^2 + 300^2} = -336$ lbs. compression

$U_2 L_2 = -\sqrt{350^2 + 700^2} = -789$ lbs. compression

Section D-D

Solution for stress in $L_1 L_2$ by method of moments:

(15) $M_{U_2} = -700 \times 5 + 10 \cdot H_7 = 0.$

Stress in $L_1 L_2 = H_7 = +350$ lbs. tension.

It will be observed that in the solution just given the method employed in each case was the isolation of the structure, in whole or in part, with all the external loads acting upon it, and the substitution for any members cut of the stresses in those members. This is a very general and important procedure applicable to nearly all problems in statics or kinetics, and is known as the "free body method". When a body is so isolated it is comparatively easy to tell whether it is statically determinate and whether it is in a condition of stable equilibrium.

The Graphical Solution for the Truss Stresses

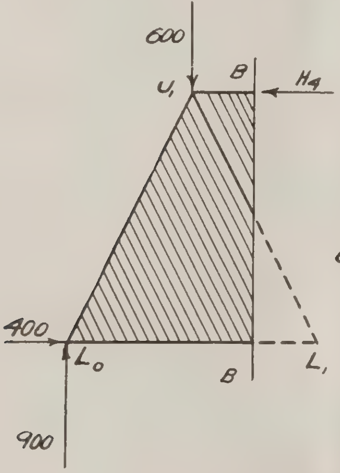
Any problem in statics that can be solved analytically is capable of a graphical solution. To obtain reactions the graphical method is seldom used. But often for stresses, particularly in a truss in which the web members have different slopes or the chords varying inclinations, it offers a ready solution to an otherwise tedious problem. This method is based on the proposition that, if the forces acting upon a structure are in equilibrium, they may be represented by the sides of a closed polygon. A force polygon is constructed by taking in order the forces acting upon a structure, and representing them, in both magnitude and direction, by the sides of the polygon. In Fig. 10, A B C D E F A is the force polygon for the external forces applied to the truss.

The first step in the solution is to make an accurate line drawing, Fig. 9, of the structure, upon which all the external forces are shown acting in the proper direction and at the correct location. Next, letter the truss in such a manner that on each side of every force and member there is one letter, and only one letter.

The truss in Fig. 9 illustrates the correct method. Now start with one of the external forces, AB and begin the construction of the force polygon for the external forces. In case all these forces are parallel, this polygon reduces to a straight line. Next, select a joint at which there are only two unknown members. Take, for example, joint L_0, Fig. 2. The members CI and IA may be considered cut, and replaced by the stress in them. The joint L_0 must be in equilibrium under the action of the four forces BC, CI, IA and AB, which may therefore be represented by the sides of a polygon. This is constructed by drawing from point C (Fig. 11) a line parallel to the member CI and indefinite in length, and from point A the line IA, which is prolonged until it intersects line CI at I. In the closed polygon thus formed CI represents, in magnitude and direction, the stress in member CI and IA the stress in member AI. In a similar manner the stresses in the members DH and HI are found by considering all forces to the left of section X-Y. These, too, being in equilibrium, may be represented by a polygon, which is A B C I H D C, of Fig. 10. By the same method point G is located and the polygon completed.

If each side of the polygon is scaled, the lengths of its sides give the stresses in all the members of the truss. To determine whether the stress in any member is tension or compression, read the letters which designate the member in a clockwise order with regard to the joint at either end of the member. Then, with the letters in the same order read the stress in the member on the force polygon. If the stress, read in this manner, acts toward the joint, it is compression; if away from the joint, tension. For example: Take members IH and HG, and use the joint L_1 at their intersection. The stress in IH is tension, because the line IH in the polygon runs upward to the left away from the joint; that in HG is compression, because the line HG runs downward to the left, toward the joint.

(To be continued)



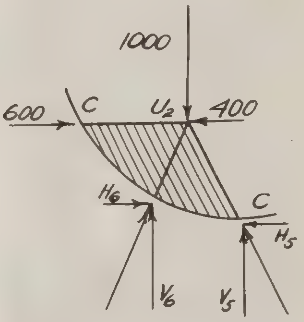


Figure 6. Truss to left of Section B-B
Figure 7. Joint U_2

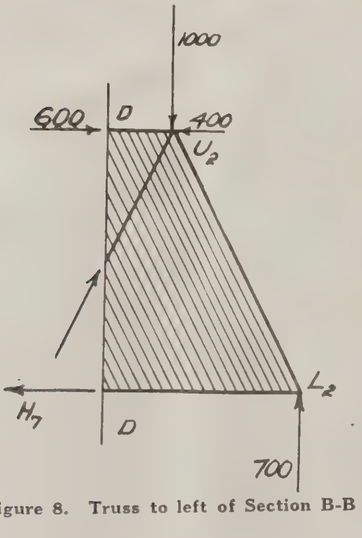
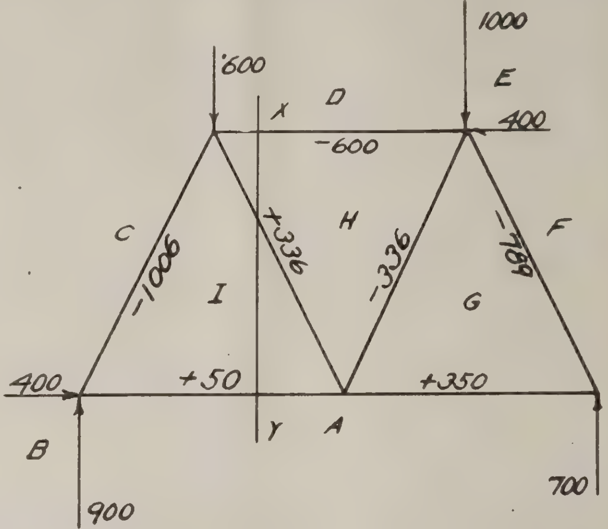
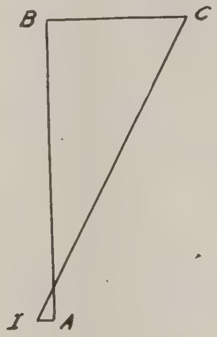


Figure 8. Truss to left of Section B-B





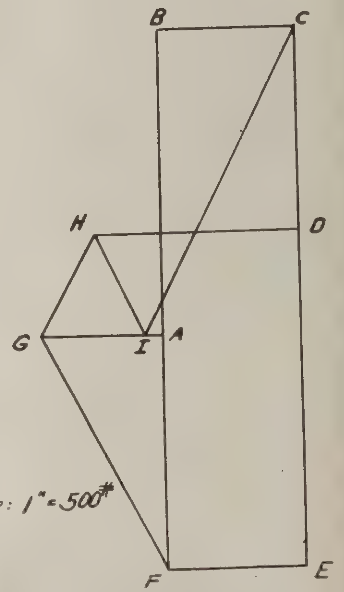


Figure 9. Warren Truss for Graphical solution
Figure 10. Stress Polygon for Warren Truss
Figure 11. Part of Stress Polygon shown in Figure 10

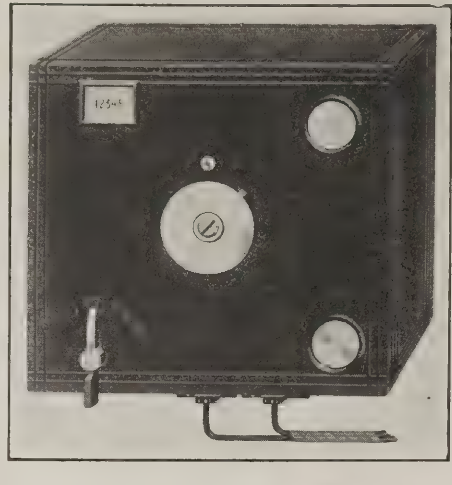
THE FAIRCHILD DISTANT CONTROL FOR AERIAL CAMERAS

By ROBERT W. ELTON

THIS control embodies the latest and most up to date mechanism for the automatic operation of Aerial Cameras.

It is designed primarily to enable one to place his camera in the most convenient location in the aeroplane and to control its operation from a distant point such as the instrument board in the pilot's cockpit, thus making it possible to use a single seater plane for photographic purposes. In this manner the expense of taking pictures from the air is minimized as it will thus do away with the necessity of using a large plane and having an Observer.

The principal device is for controlling the intervals between exposures. Thru the opening in the cover is seen a figure, this figure indicating the number of seconds that will elapse from the time one exposure is made until the next succeeding one. The operator has only to determine what interval he wishes and then turn the knob until the figure appears which corresponds. Throwing the switch (which is shown in the lower left hand corner) on to the point marked Auto starts the camera and from then until the switch is thrown off a picture will be taken at that precise interval without further attention. There will be no slowing down or speeding up of the instrument, a trouble inherent to so called speed controls.



As the control releases the shutter a pilot light (shown in the upper right hand corner) flashes, thereby assuring the operator that the shutter in the camera is functioning properly.

The number of exposures is shown on the counter in the upper left hand corner.

In order to give the operator absolute control of his camera no matter how far away from it he may be, a hand button is furnished (shown in the lower left hand corner). When he desires to take individual exposures rather than a series of overlapping pictures, he sets the switch at the point marked Hand Oper., and then proceeds to take his pictures at will, simply pressing the button once for each exposure.

The driving power is furnished by a strong clock mechanism of the lever escapement type, that will function in any position.

The instrument is connected to the camera by means of flexible electric cables attached at both ends by plugs of the Ediswan type. These plugs prevent any possible jarring loose of connections.

It is essentially an electric control, it being designed to work on 12 volts of current, furnished by either a storage or the aeroplane generator.

Most power driven cameras can be altered at small expense so that they may be operated by this control.

BOOK REVIEWS

MOTOR VEHICLES & THEIR ENGINES: By *Edward S. Frazer & Ralph B. Jones.*

The special appeal of this book is its very excellent description of the internal combustion engine. It is concise, non-technical and readily understandable.

The authors take up each detail step by step, explaining first the basic theory, then the details of construction and operation, and finally end each section with instructions for care, adjustment and repair.

The gas engine, 2 and 4 cycle motors, cooling systems, an exceptional chapter on carburetors, magnetos, and a chapter on how to drive an automobile, are some of the features of this complete little book that contains everything essential to know about a motor car.

Every owner and driver should have one in his library. 350 pages, 6 x 9 inches, 278 pictures—many in colors.

This book can be purchased from the Aeronautic Library, Inc., 299 Madison Avenue, New York City, N. Y. Price $2.25 postpaid.

THE DESIGN OF SCREW PROPELLERS: By *Henry C. Watts, M. B. E., B. Sc., F. R. Ae. S., Late Air Ministry, London.*

The book is a record of the methods used by the author for the design of propellers whilst head of the propeller branch of the Technical Department of the British Air Ministry. It embodies, as far as possible, the experience which has been gained in the application of these methods to the design of propellers for actual service in the field during the war. Investigations are made into the limiting sizes of propellers, and the book contains many charts of interest to aircraft, as well as propeller, designers.

Contents: General Terms and Definitions, The Aerofoil, Simple Drzewiecki Theory, Aerodynamic Analysis and Design, Inflow and Outflow, Combined Theory, Overall Efficiency, Flow of Air Through a Propeller, and Effect of Placing the Body in the Stream, Strength of a Propeller, Some General Considerations, Tandem Propellers, Variable Pitch Propeller, The Hub, Design of Windmills.

Copies can be purchased at the Aeronautic Library, Inc., 299 Madison Avenue, New York City, N. Y. Price $8.40 postpaid.

TEXT-BOOK ON NAVIGATION AND NAUTICAL ASTRONOMY: By *J. Gill, F. R. A. S.* Revised and enlarged by W. V. Merrifield, B.A., F. R. A. S., head master of the Liverpool Corporation Nautical College. New edition.

This work is designed to meet the special requirements of officers of the Merchant Service, and to be a complete text-book on navigation, etc., for the general student.

Candidates for Board of Trade Certificates will find in it all that is needed to cope with the new regulations for the examinations of mates and masters, from the lowest to the highest grades, as regards both practice and principles.

The new features in this edition are:

(1) Rearrangement, by which the proofs of the various problems are inserted at the beginning of the separate chapter, instead of being collected in one chapter at the end of the book.

(2) All the astonomical examples are fresh, the necessary rules are given for working them, and, where possible, an example is worked direct from the figure without using special formula.

(3) The necessary elements from the "Nautical Almanac" are embodied in the book in the form found in the "N. A." and so will afford as good practice in extracting the data as the possession of the Almanac itself.

(4) The chapters on trigonometry have been entirely rewritten, and the student is shown how to construct both plane and spherical triangles to scale.

(5) New chapters have been introduced on the projections by which any figure may be drawn to scale and on the correction of altitudes.

(6) The chapters on the tides and tidal soundings have been rewritten to suit the recent tide tables, extracts from which are found at the end of the book.

Chart work and the construction of charts have been more fully dealt with.

This book can be purchased at the Aeronautic Library, Inc., 299 Madison Avenue, New York City, N. Y. Price $7.40 postpaid.

HOW TO FLY AND INSTRUCT ON AN "AVRO": By *F. Dudley Hobbs, B. A., King's College, Cambridge, Lieutenant Second Life Guards (S. R.), and R. A. F.* With a foreword by Brig. General J. G. Hearson, R. A. F., Director of Training. With illustrations.

Though the author claims to expound the theory of flying the "Avro," he so deals with the subject that the "Avro" forms merely a suitable example with which to illustrate his reasoned explanations of the various phenomena in the control of an aeroplane in flight

Contents: The Aeroplane and How It Flies, The Pilot's Cockpit, Use of Controls, The First Lesson, Gliding and Use of Controls on the Glide, Gentle Turns with Engine, Gentle Turns Without the Engine, Steep Turns, Steep Turns Without Engine, Faults in Turns: Their Detection and Remedy, Taking Off, Landing, Sideslips, Forced Landings, Sideslips and Brake Landings, Stunting.

Copies can be purchased at the Aeronautic Library, 299 Madison Avenue, New York City, N. Y. Price $1.40 postpaid.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

(*Continued from page 656*)

A Collection of Coincidents

The connections of Director Ryan, Col. Disque, Mr. Carey and the Milwaukee Railroad with the Carey cost-plus contracts have been briefly stated. The testimony further shows that Mr. Potter, a copper king, was aircraft director from January to May, 1918. Through the United Metals Selling Co., of which Mr. Ryan was president, Mr. Potter's copper dealings were made. Mr. Potter became assistant aircraft director under Mr. Ryan in May, 1918, and remained with him until the end of the war. Their close relationship appears (p. 65) when Mr. Ryan said, "You must consider me and Mr. Potter as one man."

Col. Disque never had been on the Olympic Peninsula (p. 1439), where the $4,000,000 road was built, before making contract with Carey, while Carey first saw the country several days before that same time. Prior to April, 1918, many responsible parties tried and failed to secure a Clallam County spruce contract from Col. Disque (p. 1447). On April 12, while Mr. Potter was director, Col. Disque suddenly agreed to the $23,000,000 Carey cost-plus spruce contract at Portland. This occurred after a few hours' talk with Carey, who, with Siems and Kerbaugh, came 3,000 miles from New York City prepared to make the contract. They had never seen Col. Disque before. All were without any knowledge of logging or lumbering. They never had owned any timber nor had done any material business excepting commercial railroad construction.

Mr. Carey had previously secured help to finance the Siems-Carey Canal Co.'s Chinese contracts with the aid of Mr. John D. Ryan (p. 2807). After a few hours' discussion at Portland a spruce contract was executed by Mr. Carey and Col. Disque with Senator Donlan of Missoula, Mont., who held a one-sixth interest, acting as a witness, under which they agreed to produce 300,000,000 feet of spruce flitches in 18 months. In view of their entire lack of knowledge of lumbering or milling experience, or ownership of any timber, or knowledge of timber conditions in Clallam County, or knowledge of each other, apart from a mutual association with the same New York interests, the circumstances surrounding this sudden making of a $23,000,000 contract by New York railroad contractors is remarkable.

The Milwaukee Railroad, through the Milwaukee Land Co., owned 79,000 acres of timberland on the Peninsula. or about two billion feet out of between twenty and thirty billion feet of timber in Clallam County. The Milwaukee Road was operating in the Peninsula and had bought or constructed a total road mileage of over 100 miles from Port Townsend to Port Angeles and thence west along the Strait of Juan de Fuca to Deep Creek. This railroad company had made surveys to Grays Harbor.

Director Ryan was a director of the Milwaukee Railroad and a member of its executive committee of five. He was president of the Montana Power Co. that had a contract for electrifying the western division of the Milwaukee Road, as mentioned by Senator Donlan to Witness Cain. He was the president of the Anaconda Copper Co. and was also an influential director of the American International Corporation that controlled the Siems-Carey Canal Co.

The First Carey Spruce Contract Submitted by Disque

When Col. Disque made his spruce contract with Carey at Portland, April 12, 1918, he expected to extend the Milwaukee Road's Deep Creek line to aid Carey's lumbering contract. Col. Disque had not submitted to the officials at Washington any of the three cost-plus contracts made by him earlier in the year, aggregating $39,000,000, but after Carey's contract was signed on April 12 in Portland, Col. Disque closely followed Carey and his associates back to Washington.

Matters were held up in Washington for some weeks, and Mr. Ryan took charge of aircraft matters about April 24, 1918. Mr. C. F. Kelly, a lawyer, now president of the Anaconda Copper Co., was thereafter directed by Mr. Ryan to reform the Carey Portland spruce contract "to protect the Government" (p. 99). Mr. Kelly changed the contract by reducing the requirement of Carey to produce 300,000,000 feet of flitches to 250,000,000 feet. A fixed-price contract was changed to a 7 per cent guaranteed cost-plus contract made optional with Carey, and so prevented any loss to Siems-Carey-Kerbaugh Corporation, while the Government, by advancing to Carey under a new contract $6,000,000 in funds for operations, permitted easy-going, and "there shall be no inquiry into the profits" if 300,000,000 feet of flitches, named in the first contract, were produced. A preferential right also was given Carey under the second contract to retain the Government property for his future use upon a fixed appraisal made by a board of three persons, one selected by "the Government," one by the seller, and these were to choose the third (p. 2843). After exactly one month's delay from the signing of the Portland contract, Carey's new $23,000,000 spruce cost-plus contract was re-executed in Washington on May 12, 1918, and approved by Director Ryan on the part of the Government two weeks later—on May 28 —or after six weeks' delay.

Director Ryan wrote the Secretary of War regarding this reformed Carey contract as follows (p. 100):

> Carey stated at the beginning of the negotiations in which I had part, that they did not expect to ever secure any profit from the contract expect to the extent that they were able to amortize and reduce the cost of the plant to the Government and take it over on an appraisal that would enable them to engage in the lumber business. That was, I believe, the chief incentive in their making the contract and never disguised as far as I know.

Witness Helm, Carey's agent, testified as to this contract (p. 2937):

> We thought we had an excellent contract. Mr. Carey, and Mr. Siems, and Mr. Kerbaugh said they thought it was the best contract that had ever been made by the Government, as far as the contractor was concerned.

Of this remarkable contract Gen. McIntyre, in reviewing the Ray report, stated to the Director of the Air Service:

> The Siems-Carey-Kerbaugh contract was a most profitable one for his corporation and guaranteed a minimum profit of 7 per cent to the contractor on all expenditures, except the overhead cost of the New York office. This clause is unusually liberal inasmuch as the corporation was being financed by the Government and had the contract been carried to completion it would have meant a profit of about $1,400,000 on a project which involved no financial risk on the part of the Siems-Carey-Kerbaugh Corporation and covered a period of 18 months.
>
> There is nothing in these papers to show that any of the principal members of this firm had previous experience in this line of work, but that contract was negotiated and obtained through the efforts of Mr. Pliny Fisk, of Harvey Fisk & Sons (p. 838).

Carey's $4,000,000 Logging Railway

Although railroads were being constructed in Oregon, under Maj. Hitchcock's orders, without contracts (p. 3440), a special 7 per cent cost-plus railroad contract was given Siems-Carey-Kerbaugh to construct a railroad for the carrying out of the Siems-Carey spruce contract in Clallam County, Wash.

Director Ryan in Washington refused to approve the Carey contract because, according to his letter to the Secretary of War, "As I was a director and member of the executive committee of the Milwaukee Railway I could not act in any capacity, even advisory" (p. 99). Thereupon the contract was referred to Mr. Stettinius, Assistant Secretary of War, who negotiated it.

Assistant Secretary of War Stettinius gave Carey his 7 per cent cost-plus railway contract to build "from a point hereafter designated on the Milwaukee" to the large spruce tract, thereby ignoring the more expeditious 15-mile route to Clallam Bay recommended by the Government logging engineers and other men. This railroad contract, as stated, was dated May 18, six days after signing of the spruce contract previously drawn by Mr. Ryan's attorney, Mr. Kelly. Director Ryan then knew that a railroad to bring out the Carey spruce was to connect with the Milwaukee road, and that was the reason given by him for refusing to have anything to do with the Carey 7 per cent cost-plus railway contract.

Col. Disque hurriedly returned to Portland and called in several advisers, including Mr. Erling, western manager of the Milwaukee road, Supt. Sawyer, and other Milwaukee officials. Col. Disque says that all unanimously agreed to change the Deep Creek extension of the Milwaukee Railroad to the Crescent Lake route from Joyce Junction, although Col. Disque had previously furnished strong arguments why the Crescent Lake route was objectionable (p. 836), and although the Secretary of War had approved the Deep Creek route (p. 836), Col. Disque, on his return from Washington, suddenly announced his change to the Crescent Lake route.

(*To be continued*)

NAVAL and MILITARY AERONAUTICS

Planes En Route to Alaska Reach Fargo, N. D.

The four army aeroplanes on their way to Nome, Alaska, from New York have reached Fargo, North Dakota, after a flight of two and a half hours from Fort Snelling, Minnesota. The flyers are now entering the most difficult and dangerous part of their long flight.

The Canadian Rockies will be enconutered shortly after leaving Jasper, Alberta, and are considered the most rugged and inaccessible region in northwest America. The dangers in that region are many and every precaution will be taken to guard against motor trouble.

The character of the country makes landing extremely dangerous. If unexpected landings have to be made they will be in an uninhabited region, with little possibility of outside human help. In addition, gales blow from north to south for days and sometimes for weeks at a time.

Start Work on Aerial Defense Station on Pacific Coast

Construction work for the Army Air Service has been started and when completed will greatly increase aeronautical facilities in San Francisco.

Under the direction of Lieutenant-Colonel Ira L. Fredendall ground was broken on Crissey Field, at the Presidio, for what will be one of the most completely equipped air coast defense stations in the country. A landing field will be leveled, hangars and shops will be built, and barracks and quarters for the Air Service personnels will be erected.

Preliminary work was also started this week on the construction of a hangar and generator house at Fort Scott and similar buildings at Fort Barry. A large observation balloon will be stationed at each of these two forts. The one small balloon at Fort Barry is the only one in use by the Air Service at the present time in the San Francisco district.

Flying Certificates for Reserve Officers

Instructions recently issued by the Air Service to commanding officers of all Air Service activities invite attention to orders which require officers of the Reserve who are aeroplane pilots to submit satisfactory evidence that they have passed the required physical examinations. The instructions state that great care will be taken by commanding officers to see that Reserve officers properly identify themselves and that flight surgeons also require similar identification before proceeding with examinations. Attention is invited to the fact that former officers are not entitled to flights or examinations unless they have actually accepted commissions in the Reserve Corps. In order that no unnecessary hardship may be placed on officers applying for permission to take practice flights, such officers as may take the required physical examination and whose examination does not show defects disqualifying them will be considered qualified for flying pending certification of physical examination by the chief surgeon, Air Service, and return of certificate to the station at which it was issued. Under no conditions will defects be waived and officers not physically qualified be allowed to fly. On qualification a certificate will be issued by the Chief of Air Service showing that the officer is physically fit for flying for a period of six months. This certificate, together with the official identification card, will be presented to the commanding officers of Air Service fields when applying for practice flights in government aircraft.

Fifteen Torpedo Planes for U. S. Navy

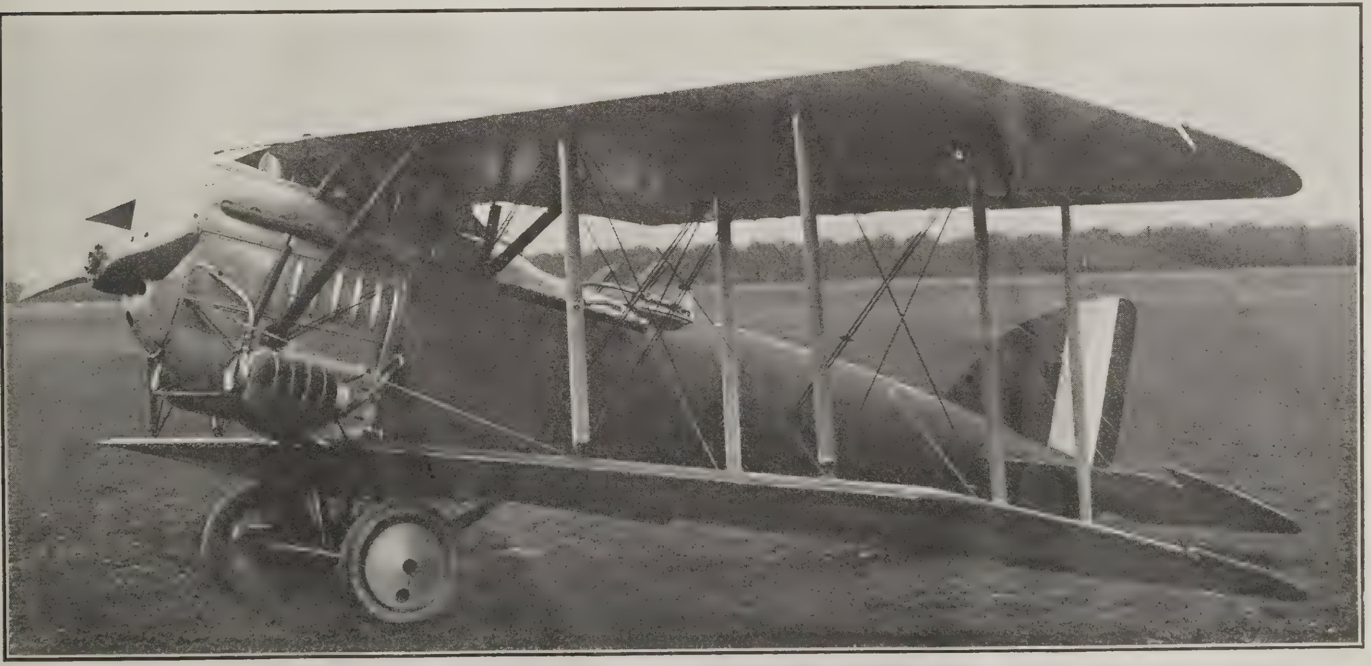
Contracts have been let with the Stout Engineering Laboratories, Detroit, Mich., for six torpedo planes for the U. S. Navy. The Curtiss Engineering Corporation has been awarded the contract for nine torpedo planes.

Record Flight of Navy Seaplanes

Report has been filed with the Office of Operations, Navy Department, of a record flight made by three F-5-L Navy seaplanes on the Pacific coast. Flying from San Francisco to San Diego without stop the seaplanes made the distance in six hours and forty-five minutes. On the return trip to San Francisco one of the planes was forced to land on the water because of motor trouble and was delayed twenty minutes, and then continued without stop. The entire trip was so highly successful that it is believed the F-5-L type seaplane can be used for photographing the entire California coast.

Navy Air Detachment Commended

Admiral Henry B. Wilson, U. S. N., commander-in-chief of the Atlantic Fleet, has communicated to the commander of the Air Detachment of his fleet commendation of the detachent for performances during the recent maneuvers. Admiral Wilson's communication reads: "The commander-in-chief commends the Air Detachment for its excellent performance of duty during day individual practice, and for its efficient work at division practice." In the maneuvers, for the first time in the history of the U. S. Navy, the actual setting of the sights was to a large extent controlled by the officers of the Seaplane Squadron, that is, spotting by aircraft had been accomplished.



A Morane-Saulnier French two seater fighter, equipped with a 400 H.P. Liberty engine

FOREIGN NEWS

Aerial Link between France and Italy

In connection with the project to link Bordeaux with Genoa by air, an air service between Toulouse and Montpellier, the second stage in the journey, was inaugurated on June 16. The first stage from Bordeaux to Toulouse service was established some time ago.

England-Holland Aerial Mail

An announcement by the Postmaster-General of Great Britain set forth recently that there would be a daily dispatch of mails by aeroplane (Sundays excepted) between London and Amsterdam. The aerial mail fee has been fixed at the low rate of 3d. per ounce, over the ordinary letter rate of 2½*d.* per ounce, and unrestricted facilities for posting will be afforded.

The contract for the carriage of the mails by air to Holland has been secured by Messrs. Handley Page, Ltd., and it is stated that the directors tendered at a rate which would have enabled the Postmaster-General to fix 1*d.* an ounce as the excess rate for the conveyance of letters by aerial mail. Unfortunately, and to the great regret of the Postmaster-General, the Dutch Government could not see their way to agree to a lower charge than 3*d.*, which is now the official rate.

There are to be two classes of aerial mails to Holland, namely, those carried for express delivery and the mails for delivery by the ordinary post. The express service will ensure the delivery of letters by the Dutch postal authorities inmmediately on their arrival at the Dutch Aerodrome, and *vice versa.* The ordinary service means that letters posted at the General Post Office before 3 p.m. any day will be delivered anywhere in Holland by the first post on the following morning. Letters for the express service will be accepted by any Post Office. Letters for conveyance by the ordinary service may be posted in the public letter boxes as usual.

The journey to Holland will occupy three hours, and passenger rates have been fixed at 15 guineas single, and £31 10*s.* return. The rates of freight by the aerial mail service have been fixed as follows: Shipments up to 10 lbs. in weight, 2*s.* 6*d.* per pound; from 10 lbs. to 20 lbs., 2*s.* 3*d.* per pound; 20 lbs. to 50 lbs., 2*s.*; 50 lbs. to 100 lbs., 1*s.* 9*d.*; 100 lbs. and over, 1*s.* 6*d.* per pound. Passengers' luggage, unaccompanied by passengers, will be charged for at the rate of 1*s.* 6*d.* per pound, minimum freight 5*s.*

A British Mission in Argentina

A civilian aviation mission, composed of the English Capts. Wilmot, Clowes and Bremner, is about to commence a short course of instruction at the Military Aeronautical School at Palermo, in Argentina.

Vickers Viking Amphibious Aeroplane

A most interesting type of aeroplane, shown at the Olympia Aero Exhibition, London, this year is the Vicker's Viking Amphibious aeroplane.

The Viking is a five-seater amphibious biplane of the flying-boat type, capable of starting from and alighting on either land or water. The hull is of the two-step type of rather unusual pattern. The planing surfaces, from stem to stem, are of V-form, the curves of the keel and chine lines being convex as far as the first step, but between the latter and the second step—which is situated some distance aft—they are concave, and from the second step the V bottom slopes upwards and tapers to the vertical knife-edge stern of the cabin. A tail skid is mounted on the keel at the second step.

The engine, a 360 h.p. Rolls-Royce, Eagle VIII, is mounted in a streamline housing above the hull immediately below the top plane, and drives a 4-bladed pusher screw. The main planes are of equal span and chord, without stagger or sweepback, but with lower plane set at a comparatively large dihedral angle. A biplane tail is fitted having two balanced rudders, in between which is a vertical fin. Wing-tip floats are also fitted.

General characteristics of the Vickers Viking:

Span	46 ft. 0 ins.
Chord	6 ft. 0 ins.
Gap	7 ft. 0 ins.
Overall length	32 ft. 0 ins.
Overall height	13 ft. 0 ins.
Weight fully laden	4,545 lbs.

Japanese Wireless Phones Link Warships and Aeroplanes

Tokio.—The Japanese navy has established a wireless telephone service between warships and aeroplanes on the wing. According to the naval authorities improved wireless telephone apparatus is now installed on board all the warships belonging to the first squadron and will be etxended to all the other warships within the present year.

Greeks Hit French Aeroplane

Constantinople—Greek cannon near Adrianople fired at a French aeroplane on its way from Constantinople to Bucharest, causing damage which forced it to descend. The pilot was Lieutenant Malleterre, son of the French General Malleterre, and he had as a passenger a British subject, J. H. MacBaffin, Director of the Levant Trading Company. There also were two French mechanics in the plane.

The machine was flying in the regular passenger service which the French Government has established with Bucharest. Explanations have been demanded from the Greeks, who recently have had some friction with the French in Thrace, charging that the French are supplying information to the Nationalist forces of Colonel Jafar Tavar.

Italian Civil Air Department Removed

The Italian Cabinet Council, which took place on June 22, was a momentous one. In addition to questions in connection with finances and food, some important Bills were drafted, one of which relates to the suppression of the existing Department of Civil Aeronautics.

The Italian Department of the Civil Aeronautics was created by Royal decree on June 30, 1919. This Department was dependent on the Ministry of Communications (which itself has been lately abolished). At the same time two Inspectorates for Aeronautics—one for the Army, the other for the Navy—were also instituted, both being dependent on the War Office.

The new organization will bring together under a unique Office all that has any reference to things aeronautical. So that the decision is considered commendable, its aims being to diminish the expenses of the Public Treasury and to get a better output than that yielded up to the present moment by the suppressed Department.

German Activity

An aerial meeting and conference on a large scale took place at Friedrichshafen on July 8, to celebrate the birthday of the late Count Zeppelin.

The factory at Friedrichshafen will shortly be enlarged threefold, making it the principal aviation factory in Germany.

A Commercial Trial Flight

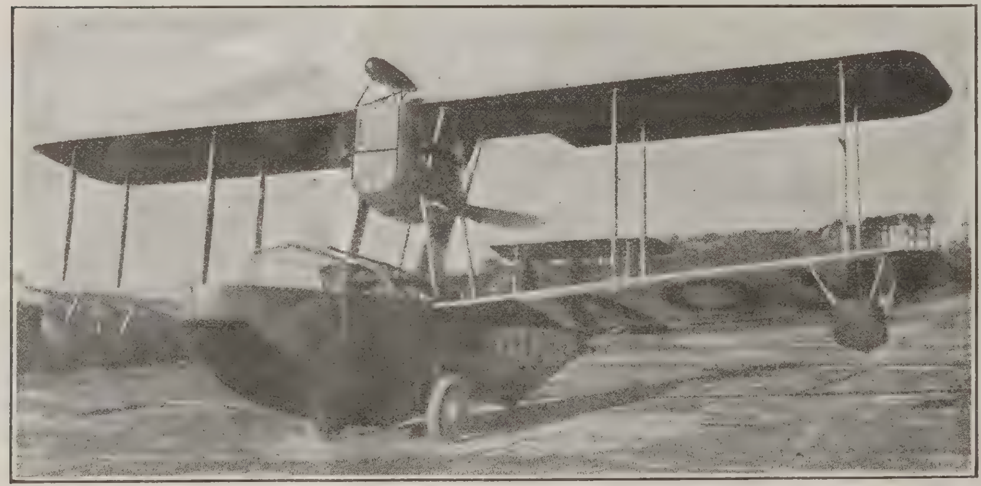
The well-known aviators, Sadi Lecointe and Coli, recently finished an air tour of the Mediterranean, designed as a test flight of the possibilities of the aeroplane for commercial purposes. The machine used was a Nieuport seaplane and the dead-weight carried about 650 pounds; the total distance covered was 2,200 miles.

Aviettes Still Trying

Two attempts were made recently to win the Peugeot prize of 10,000 francs offered to the first man to fly ten meters in two directions propelled by his own force. Both attempts failed. M. January, the first competitor, broke one of the fittings of his machine and had to abandon his attempt. The second, M. Noel, whose machine looked like a gigantic sparrow, failed to rise. M. January's machine is fitted in front with a propeller worked by the hands and feet; the movements of ascent and descent are controlled from the seat of the machine by the pilot leaning forward or backward.

Another French Aviatress

A fourteenth lady has now qualified for an aviation pilot's license in France. This is Mlle. Gabrielle Deshayes, who passed her tests at the Brequet School at Le Crotoy. She started flying in 1917 at Lyons, and will shortly be leaving for Holland to carry out a series of exhibition flights.



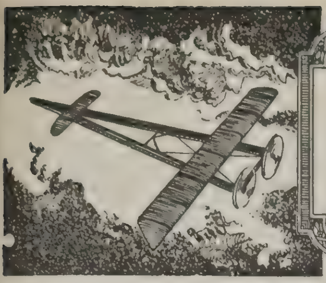
Vickers Viking Amphibious Aeroplane, equipped with 360 H.P. Rolls-Royce Eagle engine

Business Men and the Aeroplane

Business men are not only using the aeroplane for the prompt conveyance of urgent samples, but are also beginning to realize that it offers a certain means of reaching a long distance destination hours ahead of a fast train that may have been missed. A recent instance relates to two gentlemen connected with important commercial interests who were unable to catch the train to Stoke-on-Trent, England, and were in danger of missing a most important business engagement. A phone message to the Cricklewood Aerodrome, near London, resulted in a Bristol Fighter plane being in readiness for them when their taxi arrived, and Lieutenant Helliwell piloted them safely to their destination in record time.

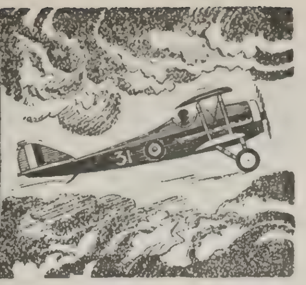
Two More Aerodromes for Canada

Two Canadian aerodromes, at Alberta and Calgary, respectively, are to be established for instruction and Government work.



ELEMENTARY AERONAUTICS and MODEL NOTES

By John F. McMahon



The Construction and Design of Aviettes

Just as a wing is designed to carry or lift a certain weight so a flat surface is designed to do certain work and in order to do so the plate or surface must be set at an angle to the direction of travel in order to have the wind act on it. The forces thus created can be figured from the following table:

(Continued)

ASPECT RATIO = 1.

Angle	K_y	K_x	L/D
5	.00045	.00007	6.3
10	.00097	.00019	5.1
20	.00208	.00074	2.8
30	.00294	.00173	1.7
45	.00207	.00210	.99
60	.00139	.00245	.57
ASPECT RATIO = 2.			
6	.00074	.00010	7.5
10	.00123	.00021	5.9
20	.00247	.00091	2.7
30	.00178	.00111	1.7
40	.00169	.00146	1.2
60	.00126	.00225	.56
ASPECT RATIO = 3.			
6	.00090	.00011	7.6
10	.00140	.00028	5.1
20	.00210	.00077	2.7
30	.00193	.00111	1.7
60	.00140	.00236	.59
ASPECT RATIO = 6.			
6	.00109	.00018	6.3
10	.00173	.00034	5.2
20	.00199	.00074	2.7
30	.00204	.00120	1.7
60	.00141	.00244	.58
ASPECT RATIO = 1½.			
10	.00109	.00020	5.6
20	.00215	.00070	2.8
30	.00198	.00095	1.7
40	.00183	.00152	1.2
60	.00127	.00226	.57
ASPECT RATIO = ⅓.			
6	.00033	.00007	4.4
10	.00059	.00014	4.2
20	.00138	.00053	2.6
30	.00219	.00132	1.7
45	.00246	.00250	.98
60	.00155	.00264	.58
ASPECT RATIO = ⅙.			
6	.00020	.00005	4.0
10	.00040	.00010	4.0
20	.00114	.00045	2.6
30	.00176	.00102	1.7
45	.00217	.00217	.99
60	.00163	.00282	.58

Distance of Center of Pressure from Leading Edge, Measured in Terms of Chord for Flat Plates of Various Aspect Ratios.

Aspect Ratio = 1

Dist.	Angle
.12	.8
.16	1.0
.18	2.0
.20	2.8
.22	3.8
.24	6.5
.28	13.0
.30	15.3
.32	18.0
.34	21.0
.36	25.0
.38	28.0
.40	33.5
.42	39.0
.44	55.2
.46	73.5
.48	84.0

Aspect Ratio = 3

Dist.	Angle
.233	5.0
.267	7.8
.300	10.0
.333	12.0
.367	13.8
.400	17.5
.433	52.8
.467	73.7
.500	90.0

Aspect Ratio = 6

Dist.	Angle
.267	3.0
.300	8.0
.333	10.0
.307	12.2
.400	26.0
.433	54.0
.467	73.7
.500	90.0

Aspect Ratio = ⅓

Dist.	Angle
.167	3.0
.267	5.0
.283	6.8
.300	10.8
.317	17.5
.333	30.5
.350	45.0
.367	47.8
.383	50.2
.400	52.5
.417	54.3
.433	56.5
.450	65.0
.467	77.8
.483	85.8
.500	90.0

Aspect Ratio = ⅙

Dist.	Angle
.289	2.5
.311	7.5
.323	10.5
.334	19.0
.345	49.0
.356	52.0
.367	53.5
.378	56.2
.389	58.0
.400	59.5
.411	60.0
.422	63.0
.433	64.0
.444	68.5
.455	72.5
.466	80.0
.477	84.0
.488	87.5
.500	90.0

You will notice that the columns are headed Ky and Kx the same as for a wing section and the forces are figured exactly the same as if you were figuring the lift of a wing.

To turn a machine to the right or left a certain amount of work must be performed because a mass must be moved and the rudder or tail planes moves this mass. To make the work easy these parts are set some distance away from the axis or turning point and this makes the work easier the same as a man with a long-handled lever can lift a greater weight than if the handle was short. A force of 10 lbs. acting 10 feet from the pivoting point will do the work of 100 lbs., etc.

The table is divided up into sections headed aspect ratio 1, 3, etc. The aspect ratio means the proportion of width to chord, for example aspect ratio 3 means the length is 9 feet and the chord 3 feet or a rudder 3 feet high and 1 foot wide. Notice that the higher the aspect ratio the more effective is the surface.

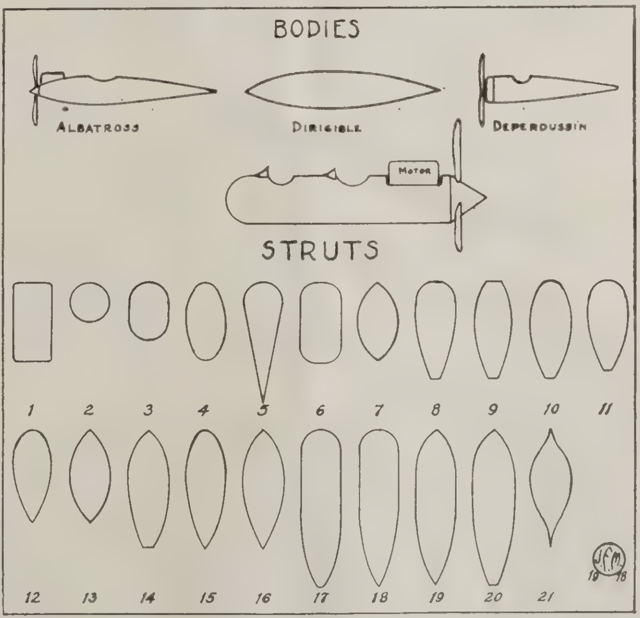
We now come to body shapes. The best and most efficient body is the one with the least resistance. To increase the efficiency of an aviette the pilot and bicycle should be enclosed in some kind of a light streamlined body. The shape labeled dirigible would be the best for this particular case but I would suggest having the nose more rounded instead of pointed as shown.

Resistance for a body having a shape like that in use on the German Albatross scouts, which is almost a perfect streamline, figures out as approximately 15 lbs. at 60 M.P.H., the resistance of the radiator and that part of the engine which is exposed along with opening around the engine, opening of cockpit, etc., must be added to this, which would bring the total resistance of the body up to about 40 lbs. A perfect total resistance of "dirigible" form being 5¾ times as long as its greatest width, and whose greatest cross section figures out at 8 square feet area has a resistance of only 7.4 lbs. at 60 M.P.H. That is, if no openings or other irregularities occur to disturb the wind when passing the body.

A body like the old Deperdussin racing monocoque, having a rotary motor partly enclosed in the nose, and whose length is 5.6 times its greatest thickness, figures out 15.6 pounds' resistance when the greatest cross section figures out at 8 square feet.

Pusher bodies have less resistance than tractor bodies, because the body is not in the slip stream of the propeller, but when you consider the uncovered outriggers in use on pusher machines the resistance is found to be much greater than for tractor machines.

The Continental Pusher Biplane is a good type. The body of this machine, which was made of veneer, and of very good streamline shape, showed a resistance of only 10 pounds at 60 M.P.H. See attached cut.



(To be continued next week)

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

First Indorsement

"Louis got a notice today from the War Department that he had been killed in France."

"What did he do about it?"

"Wrote back at once telling them to do nothing further until they heard definitely from him."—*American Legion.*

"Work" At Its Best

Asked what he considered light work was, a man at a court said: "When you sit down and watch others do it."

No! No!

First Mechanic: So she turned you down, eh?

Second Mechanic: Yes, I always was unlucky at love. Why, if I had been Adam, I'll bet Eve would have remained an old maid.—*Panther.*

Some Runner!

Pilot: Who was Diana?

Observer: Diana was the goddess of the chase.

Pilot: I 'spose that's why she always has her picture taken in a track suit.—*Juggler.*

MISSES' RAINBOW! AND A, "STAR" OR TWO!

"ALL AMERICAN"
(LINCOLN BEACHEY)

I flew millions and millions of miles, and then I came across the, "Milky Way". The "Inspector of Weights and Measure's", gave me a;-

"Certificate".

Gee! I never saw so many dressing rooms, each "Star" has one, the first one on the right, was "Venus" then "Saturn"; the "Sun", he wears a pair of;-

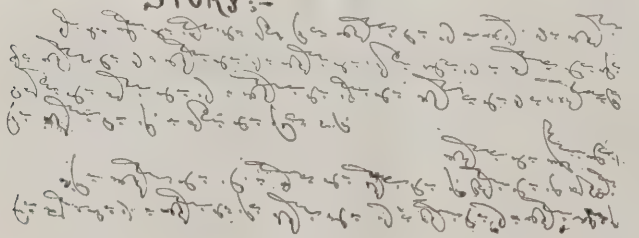
"Asbestos Hip-Boots".

So that he don't "Curdle" the Milky Way. And the "Moon", she wears a;-

"Ice Cream Kimona".

The "Misses' Rainbow", are all "Sisters", their "dressing" Rooms", are very, very beautiful, and this is their;-

"STORY";-



One of an interesting series of pages contributed by a reader in China

Sky Jazz

You can talk of your sports on land and on sea,
Just talk till you make people sigh,
But for down-right enjoyment there's nothing can touch
A "Joy-jazz" 'way up in the sky.

Just to climb in your buss when it's hot here below
And call out "contact" to your mech,
Then give 'er the gun and mount up and up
Until you look like a tiny black speck.

Away to the right you may see mountain peaks,—
Perhaps to the left a rain,
While far, far below you the lightning express
Goes creeping across the plain.

The rivers appear but ribbons outstretched
Through fields that are just dots of green,—
The cities are but playthings for the gods,—
The mountains but hole-hills between;—

With the clouds drifting by you all fluffy and white,
Afloat in a sea of blue,
And you play "hide-and-seek" midst their billowy peaks—
The gods, the sunshine, and you.

It is then a wild joy steals all fear from your heart
Anr you start doing stunts with your "hack,"—
You loop 'er, whip-stall 'er, tail-spin 'er, and roll—
Then spiral 'er down on 'er back.

That's what I call sport, if there is such to be found,—
It's as gripping and contagious as sin;
It's dangerous, I suppose,—but the flier knows
It's the greatest of games for MEN.

John Wes Maxcy, former Test Pilot, Post Field, Fort Sill.

That's How

"How did Chollie come to fall from his aeroplane?"

"Lost his head. He was stuck on a girl in Springfield, and she invited him to drop off there."—*American Legion.*

A Good Excuse

Her Father: "What is your reason for wanting to marry my daughter?"

Aviator: "No reason, sir. I am only in love with her."

Hints for the Home

An outworn Ford body, bent to a new design and covered with cretonne, makes a cute umbrella-stand for the hall.

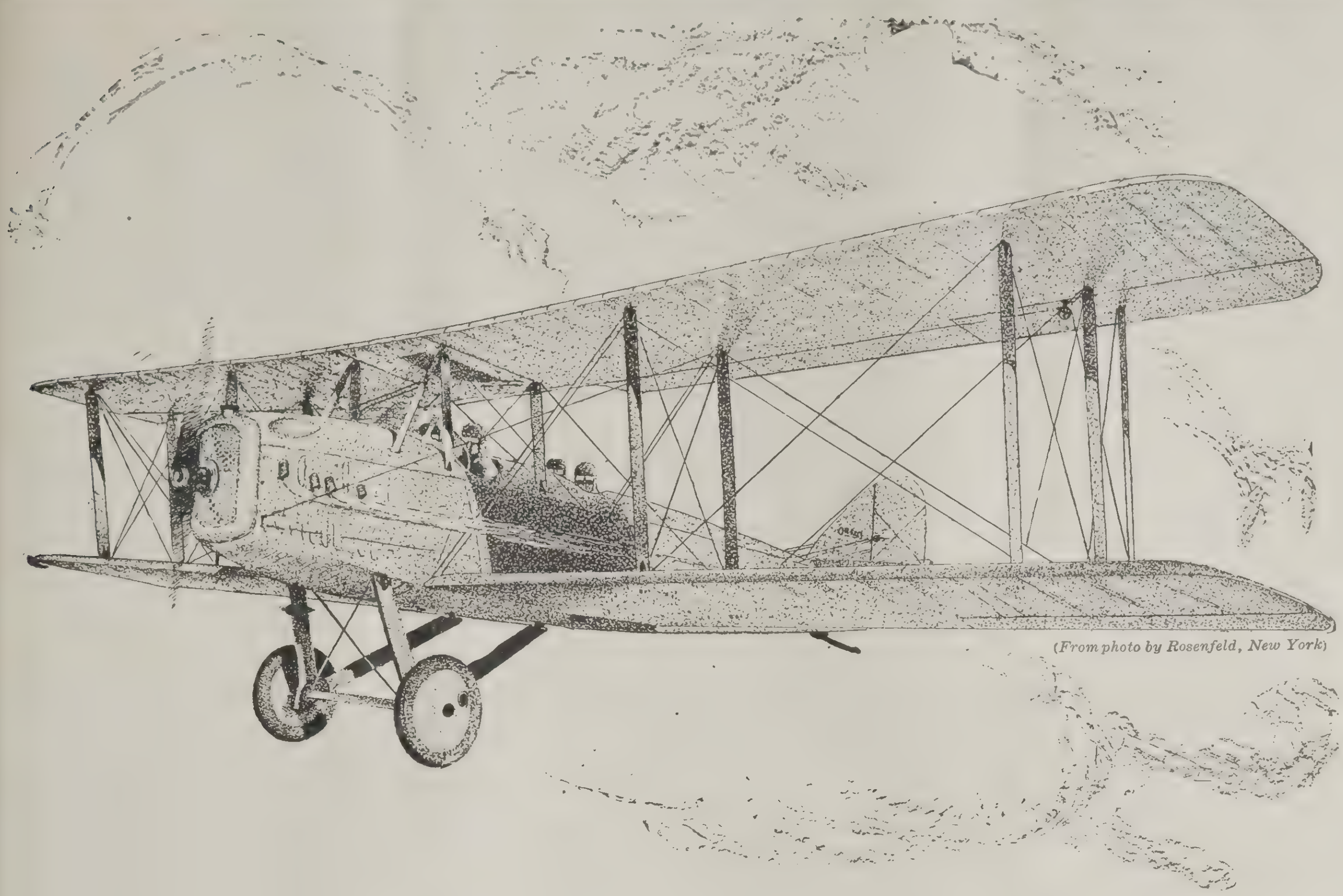
Detroit Motor News.

The Difficulty

"Do you think, dearest, that you could manage on my salary?" the aviator asked.

"Why, yes; I think I could, darling," the girl responded; "but how in the world would you get along?"

—The Home Sector.



(From photo by Rosenfeld, New York)

UP in the air 17,150 feet with pilot and three passengers aboard! The Orenco Type F Tourister made this great record recently — *and Valspar helped.*

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(Continued from page 705)

plus funds needed to redeem the Flying Club's bonds referred to, which are held by the said Manufacturers' Aircraft Association, which Association, as already stated, has been condemned by the U. S. Senate Investigating Committee as "vicious and designed to reap large profits by taking advantage of the necessities of the Government"; **in view of the foregoing and the fact that the irregularities of the said Association complained of by said U. S. Senate Investigating Committee are under consideration of, and are to be reviewed by, the U. S. Attorney General, it would obviously be harmful to the Aero Club of America, which is the national aeronautic organization, and against the best interests of the country and the Club, and its members, to permit the Aero Club of America to sacrifice its present financial independence and become financially dependent upon the said Manufacturers' Aircraft Association.**

(20) I have received a letter from Mr. Charles Jerome Edwards, acting president of the Aero Club of America, similar to the letter dated July 14th, 1920, received by Major Charles J. Glidden. Mr. Edwards has not been active in the Club for a number of years and is not familiar with the facts stated herewith. I have tried to confer with Mr. Edwards regarding this matter, but he has refused to do so, stating that he had not the time to go over this matter, as he was going out of town. He stated that it is his intention to resign as an officer of the Aero Club as soon as the so-called amalgamation goes into effect. I asked Mr. Edwards on July 14th, 1920, whether he knew that the cost of operating the building leased by the Flying Club and conducting that Club has caused said Flying Club deficits of close to $50,000 and would ruin the Aero Club of America. He said he did not know the figures.

(21) I have attended all the meetings of the Board of Governors of the Aero Club and know that the claim made in the letter that the plan of amalgamation was approved by the Board of Governors of the Aero Club is incorrect, and the minutes of the meeting will so prove it.

(22) I also know that the action proposed and threatened in the letter of the said Charles Jerome Edwards is contrary to the provisions of the Constitution and By-Laws of the Aero Club of America.

Conspirators Taking Advantage of Absence of Fifteen Governors of the Club

(23) That efforts are being made by defendants to execute these secret and unlawful proposed contracts on behalf of the Aero Club of America which would ruin said Club, without the approval of the majority of the twenty-four members of the Board of Governors of the Aero Club of America and during the absence in Europe and elsewhere of the president of the Club and the following governors and officers of the Club: Jefferson de Mont Thompson, Major Granville A. Pollock, Brigadier-General Robert K. Evans, Rear-Admiral Bradley A. Fiske, U. S. N.; Major A. B. Lambert, U. S. A.; Col. Henry B. Joy, U. S. A.; Commodore Louis D. Baumont, Lieut. Godfrey L. Cabot, Alan R. Hawley, Allan A. Ryan, Alberto Santos-Dumont, John Hays Hammond, Jr.; George M. Myers, Henry A. Wise Wood, and Robert M. Graves, and that as these gentlemen and deponent are members and officers of the Club in good standing they are privileged to know and it is their legal right to expect that they be advised of any proposed change in the constitution of the said Aero Club and as provided for in the said By-laws and Constitution of said Aero Club.

(24) That for the above stated and other reasons, the deponent and other governors and members of the Aero Club of America in good standing are in good cause dissatisfied:

WHEREFORE, Deponent asks that a writ or writs of injunction may issue out of this Court provisional and until final hearing, enjoining and restraining the Board of Governors of the Aero Club of America, and the officers or any committee thereof from directly or indirectly continuing the negotiations for the amalgamation of the Flying Club with the Aero Club of America or vice-versa, or from in any manner or by any act cause the Aero Club of America to enter into any agreement with, or assume any liability of the said Flying Club or the Manufacturers' Aircraft Association or any organization that may be employed by the said Flying Club of said Association to attempt to cause the Aero Club of America to assume its financial liabilities or other responsibilities, and that upon final hearing of the case said provisional injunction may be made perpetual, and granting to deponent such other and further relief as the Court may deem just and proper.

Deponent asks that this action be brought on by an order to show cause instead of the longer process prescribed by the Code of Civil Procedure for the reason that the action on the proposed amalgamation complained of is set down for the 21st day of July, 1920, and if deponent were required to give the full notice required by the Code any relief that might be granted to him by this Code would be valueless, because the right of third parties would have been affected before deponent could avail himself of the benefit of such relief.

Sworn to before me this 20th day of July, 1920.

(Signed) HENRY WOODHOUSE.

(Signed) JOHN J. HALEY,
Notary Public, New York County, No. 8.

Exhibit "A"

New York, July 16th, 1920.

Mr. Henry Woodhouse, No. 280 Madison Avenue, New York City, N. Y.

My Dear Mr. Woodhouse: Regarding a conversation between Lieut. Col. James A. Blair and Col. Milton F. Davis over the 'phone in the latter part of April, 1919, with reference to his attitude toward yourself, Mr. Hawley and the Aero Club of America:

I beg to state that while I was awaiting an audience with Assistant Secretary of War Crowell with reference to the matter before the Secretary of State on the assistance offered by the Aero Club of America for the anchorage of the visiting British dirigible, R-34, this in the ante-room adjacent to the office of the Assistant Secretary of War, I accidentally overheard the above mentioned 'phone conversation, which, in part, to the best of my recollection, was as follows (Col. Blair talking to Col. Davis):

"I shall have a talk with several of my friends in the Automobile Club and will use every effort to oust Woodhouse and Hawley from the Aero Club—even if we have to smash the Club, and will use every effort to have them and their management discredited with the Federation Aeronautique Internationale."

This 'phone conversation was overheard accidentally by me while awaiting an audience with the Assistant Secretary of War on behalf of the Aero Club of America and acting as the Washington representative of said Club.

I immediately returned to my office in the Union Trust Building and 'phoned to New York to the Aero Club to Secretary Post with a result that I left at once for New York, getting in touch the same date with Mr. Hawley and going to Atlantic City to confer with you that same night.

I listened attentively to this conversation, as it interested me as a representative of the Aero Club. I verified the name of the officer 'phoning as that of Col. Blair as he was passing from his office through the ante-room to confer with Assistant Secretary Crowell. Yours very sincerely,

(Signed) W. H. L. HOWARD.

Witness:
(Signed) Mark Ovenden.

Exhibit "B"

WAR INDUSTRIES BOARD,
Washington,
B. M. Baruch, Chairman.

Mr. Augustus Post, Secretary, The Aero Club of America, 297 Madison Avenue, New York City.

Dear Sir: Referring to the memorandum enclosed with your letter of October 26th, particularly on page 3, referring to me, the remarks are quite correct that I was responsible for the objection to the contract discussed. It was one of the worst contracts I ever saw, involving such a huge profit that I refused to approve of it or make the recommendation so that the money could be obtained from the Treasury. Immediately on my objection, $1,300,000 was taken off the contract. It was one of those contracts that was made apparently by an authorized agent of the Italian Government, but it was done at such prices that I never did approve of it. If there is any possible way of finding out whether any of the names connected with this benefitted by this contract, which at the time it was reported to me showed a profit of some $4,000,000 on a $13,000,000 contract, I think in the public interest it would be most advisable. I should be especially interested to receive any information which would show that anyone had used the official paper of the War Industries Board for the purpose of obtaining material improperly.

Although I was not Chairman of the Board at that time I would not hesitate to put the prosecution of such an individual in the hands of the Department of Justice, with the request to proceed to the uttermost limit. You cannot do a greater public service than to run down the truth or falsity of the connection of Diffin and Conger, and I will be glad to place at your disposal anyone of the departments under me and use my best efforts to get the co-operation of any other Government department. Yours very truly,

(Signed) BERNARD M. BARUCH.

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AUG 10 1920

AERIAL AGE
WEEKLY

11, No. 22 AUGUST 9, 1920 10 CENTS A COPY

Airscape of the Chicago Freight Yards

A. C. A. Members Form Committee to Fight Schemers' Ruse to Get Control of Club

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VOL. XI AUGUST 9, 1920 NO. 22

TABLE OF CONTENTS

PAGE

A. C. A. Members Form Committee to Fight Schemers' Ruse to Get Control of Club 733

Evidence of Vicious Conspiracy to Destroy Aero Club of America Submitted to Supreme Court..... 734

The News of the Week............ 736

The Aircraft Trade Review....... 738

U. S. Aerial Mail................ 739

The Lincoln Standard Speedster... 740

The Structural Analysis and Design of the Aeroplane.............. 742

Naval and Military Aeronautics.... 747

Foreign News....................748

Elementary Aeronautics and Model Notes 749

Aeronitis 750

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures............ 752

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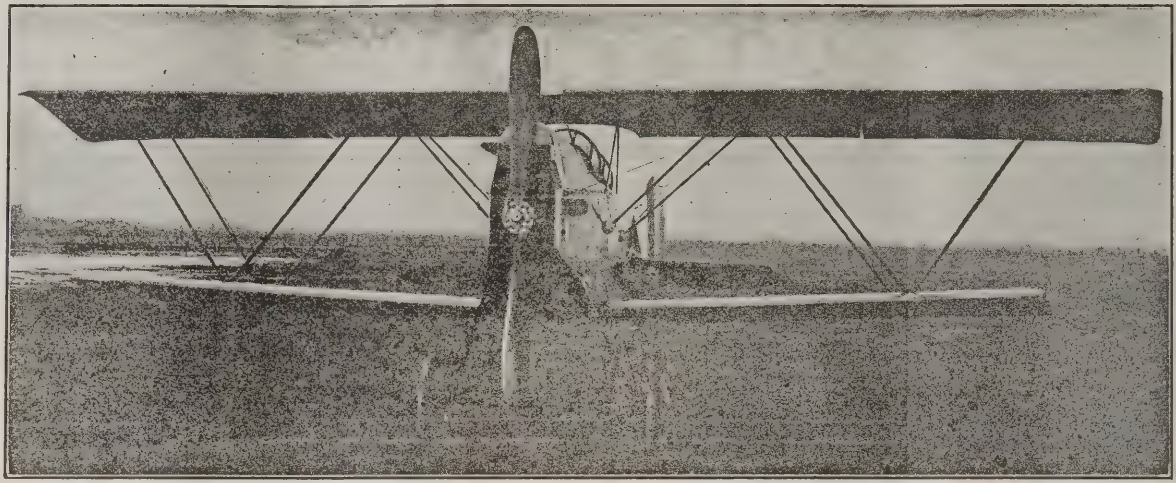

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A. C. A. MEMBERS FORM COMMITTEE TO FIGHT SCHEMERS' RUSE TO GET CONTROL OF CLUB

Investigation of Committee to Protect Legal, Financial and Moral Rights of Members of Aerial Club of America Discloses Bold Conspiracy to Obtain Control of Club at An Irregular Meeting On August 16th

On July 28th some members of the Aero Club of America were asked to sign a paper reading as follows:

"The undersigned members of the AERO CLUB OF AMERICA hereby propose that the Constitution of the Aero Club of America be amended, or the present Constitution rescinded and a new Constitution adopted, so as to read as per copy of such proposed amended or new Constitution hereto annexed:—"

A number of the members who signed this paper state that the purpose of this document was represented to them as being simply to conduct some "routine club business," and they were told that the matter besides being only "routine club business" had been duly approved by the Board of Governors of the Club.

Now they find that their signature was obtained under misrepresentations, and find that their signatures have been used to call a special meeting and appoint the three defendants in the action now before the Supreme Court, Charles Jerome Edwards, Charles L. Poor and James A. Blair, Jr., a proxy committee with power to vote said proxies at a short notice meeting to be held on August 16, and to adopt so-called "proposed revised by-laws" which entirely abolish the legal rights of members and Governors of the Aero Club aimed to permit the three defendants above named to turn over the control of the Club to the Manufacturers Aircraft Association and wipe out the Aero Club's treasury surplus and make it assume the ruinous operating cost of the American Flying Club, which involved a deficit of over $50,000 during the past year.

Analysis of New By-Laws Drawn by Defendants, Which They Are Attempting to Adopt at a Fake "Special Meeting" of the Aero Club of America On August 16th:

Under the heading "Elections," Chapter II of the By-Laws the defendants propose the following new and vicious and despotic by-laws, which practically abolish the constitutional rights of the members of the Aero Club:

"Section 1. The terms of office of all officers, governors and committees elected or appointed prior to August , 1920, shall expire at the concluson of the Special Meeting of the Club of that date and new Governors shall be elected at such Special Meeting, without nomination as hereinafter provided for in Section 5 of this Chapter, for such terms as may be specified in the Election. Thereafter

"The Governors shall be elected by ballot at the annual meeting of the Club. The polls shall remain open for one hour.

"Section 2. The Board shall consist of twenty-four members of the Club, at least eighteen of whom shall be resident members of the Club, designated as 'Governors, Class A.' The remaining six may be either resident or non-resident members, and shall be designated 'Governors, Class B.'

"Section 3. The Governors, Class A, shall hold office for the term of three years and until their successors are elected. The Governors, Class A, shall be divided into three groups of six governors each, so that the term of office of one group of six Governors, Class A, shall expire each year.

* * * * *

"Section 6. The President and the Vice-Presidents shall be elected by the Board of Governors at a meeting held on August , 1920, and shall hold office until the next annual meeting of the Club, Thereafter

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"The President and the Vice-Presidents shall be elected by the Board of Governors at a meeting held on the second Monday in November, immediately following the annual meeting of the Club, and shall hold office for one year and until their successors be elected."

Under Chapter VIII, Section 1, occurs the following vicious absurdity, which would permit the defendants in the name of the Board of Governors to expel members of the Club who own publications—like Ralph Pulitzer and Herbert Pulitzer, owners of the New York *World;* Ogden Reid, owner of the New York *Tribune;* Rodman Wanamaker and James Elverson, owners of Philadelphia newspapers; Henry Woodhouse, owner of several aeronautic publications, and other owners and editors of publications, if they should print anything pertaining to the Club, which the members of the Board who are trying to obtain control of the Club under misrepresentations might not like:

"Section 1. * * * No member shall use the Club stationary for business purposes, or date or address from the Club any business letter, circular or document, or imprint the name of the Club upon his stationery or business documents or publications."

It will be noted that this provision also deprives the members of the privilege of using Aero Club stationery to which the Club agreed when they joined the Club.

To insure the complete crippling of the Aero Club of America activities, the conspirators have eliminated the provision which provides for a weekly meeting of the Board of Governors to attend to the Club business and have replaced this provision with the following preposterous by-law, under Chapter IV:

"Section 2. The Annual Meeting of the Board of Governors shall be held on the second Monday in November, immediately following the annual meeting of the Club, and regular meetings shall be held on the first Wednesday of each month from October to June inclusive, at such hour as may be fixed by the Governors. Special meetings may be called by the President or by any five members of the Board."

Only one meeting a month, and no meetings from June to October—the very months when the Club's official activities are greatest, would prevent the Club from directing, supervising and officiating at aeronautic events, granting throughout the country, granting sanctions for such events, granting licenses to aviators, accepting new members, etc., etc. Therefore the Flying Club and the Manufacturers Aircraft Association would have the opportunity of completely destroying, discrediting and replacing the Aero Club of America.

Anyone who is member of Clubs and national associations and is familiar with general practice and procedure for revising the constitution and by-laws of organizations knows that the procedure and methods adopted by defendants to get control of the Aero Club are against all rules and regulations and practice and positively unethical, unfair, unsportsmanlike, and violate the written and unwritten laws which govern the affairs of membership organizations.

The regular procedure when revision of more than one of the by-laws is proposed is by ballot, giving an opportunity to the members to vote on each of the proposed changes, and allowing at least sixty days before vote is taken so that all the members can be reached and have an opportunity to make a thorough study of the proposed changes and their effect on the welfare of the organization.

Defendants not only disregarded the above rules, but also failed to specify in their notices to members the number of proposed changes in the by-laws and have concealed the financial deficits amounting to over $50,000. a year which they are planning to make the Aero Club and its members assume in taking over the operation of the Flying Club Houses, and also fail to state that one of the proposed changes in the by-laws increases the dues of resident members and another will decrease the number of out-of-town governors, therefore, will tend to localize the Aero Club by decreasing the number of governors that can be elected from different sections of the country.

A committee which includes over thirty members, has, therefore, been formed to protect the legal, financial and moral rights of the Aero Club of America. This committee will take legal action, if necessary, to stop the carrying of the schemes of the defendants and submit the matter to the entire membership of the Club, to be voted on by the members under the legal and proper procedure, so that all actions to be taken in changes of by-laws shall be based on the majority vote of the entire membership on proper and sufficient notice.

EVIDENCE OF VICIOUS CONSPIRACY TO DESTROY AERO CLUB OF AMERICA SUBMITTED TO THE SUPREME COURT

SUPREME Court Justice Glennon, at Special Terms, Part 1, New York County, heard on July 30th arguments on plaintiff's motion for an injunction pendete lite Henry Woodhouse vs. Charles Jerome Edwards, Charles L. Poor and James A. Blair, Jr., individually and as Governors of the Aero Club of America, and received the evidence of attempts to wreck the Aero Club of America made by the same individuals who call themselves the "Manufacturers Aircraft Association" whose methods have been condemned by the U. S. Senate Investigating Committee as "vicious and designed to reap large profits by taking advantage of the necessities of the Government," and are accused of having obtained millions of dollars from the Government under misrepresentations and schemes which are being investigated by the U. S. Attorney General.

The plaintiff, Mr. Woodhouse, who started the action on behalf of a number of members of the Club who learned of the conspiracy on foot, was represented by his attorneys, Nugent and Nugent of No. 280 Madison Avenue, and the defendants, Charles Jerome Edwards, Charles L. Poor and James A. Blair, Jr., were represented by Hornblower, Miller, Garrison & Company.

Daniel F. Nugent who opened the case summarized the contents of the affidavits submitted by the plaintiff and by Major Charles J. Glidden (printed in AERIAL AGE last week) and said in part:

> "Plaintiff acting for the Aero Club of America and for the welfare of the country, opposed a conspiracy to destroy government aeroplanes which had cost the American public over one hundred million dollars, which the Manufacturers Aircraft Association was attempting to get destroyed, so its members could reap additional large profits from government orders and from the sale of aeroplanes to ex-Army and Navy aviators at high prices which could be obtained if the Government could be prevented from selling 'surplus' aeroplanes at reasonable prices, which the conspirators planned to achieve by having the Government aeroplanes destroyed as 'unsafe.'"

How the Scheme to Destroy Aeroplanes Costing Over $100,000,000 Was Brought to An End

Attorney Nugent then quoted to Judge Glennon Plaintiff's affidavit telling how this scheme to burn up aeroplanes costing over $100,000,000 and charging high prices to ex-Army and Navy aviators for aeroplanes was brought to an end, as follows:

> **"In answer I told him that if they could prove that these aeroplanes which had been produced for the training of the twenty thousand American aviation students in the United States and several thousand American aviators overseas, and for the protection of the two million American soldiers overseas, and for winning the war; if he could produce evidence that such a crime had been perpetrated against the American people, then I would urge burning the aeroplanes, but would also urge hanging the guilty parties as traitors. This propaganda to have the aeroplanes burned lasted until the indignation caused by the published report of the burning of a large number of aeroplanes of the American Expeditionary Forces showed that the American public would not permit such a wanton destruction of aeroplanes which had cost over one hundred million dollars."**

Schemes to Wreck Aero Club and Destroy Evidence Needed for Government Investigations Revealed

Evidence was submitted that plaintiff acting as an officer of the Club and individually had also opposed schemes by which individuals who are conspiring with the defendants obtained millions of dollars of public funds, by means which the U. S. Senate Investigating Committee condemned as "vicious and designed to reap large profits by taking advantage of the necessities of the Government."

The evidence submitted to Judge Glennon showed that this is a case far reaching, and of national importance. It involves a national welfare and national honor and is to prevent a few vicious, selfish schemers from defeating the purposes of Justice.

While the U. S. Attorney General is investigating the evils referred to, a conspiracy is being perpetrated for the purpose of obtaining control of the Aero Club of America and destroying the evidence of these misdeeds.

Attorney Nugent stated that part of this conspiracy complained of aims to attain the following despicable objects:

1. Bankrupt the Aero Club of America by forcing it to take over the operation of the American Flying Club which caused a deficit of over $50,000 to the Flying Club during the past year and would dissipate the present Aero Club of America treasury surplus and plunge the Club into insolvency.
2. Discredit the Aero Club of America by circulating false statements regarding the Club's standing and membership.
3. Take control of the Aero Club of America and destroy the evidence of misdeeds of certain individuals against the U. S. Government.
4. Abolish the rights of the officers and members of the Club by the adoption of vicious by-laws which give control of the Club to three individuals.
5. Adopt by-laws which will enable the defendants to expel members of the Club who own newspapers and periodicals like Ralph Pulitzer and Herbert Pulitzer, owners of the NEW YORK WORLD, and Ogden Reid, owner of the NEW YORK TRIBUNE, James Elverson and Rodman Wanamaker, owners

of Philadelphia newspapers, and Henry Woodhouse, owner of a number of publications, if they should print anything pertaining to the Club of which they did not approve.

6. To obtain control of Aero Club of America funds amounting to $20,000 and valuable trophies and force the Club to assume liabilities amounting to over $50,000 a year above the possible earning capacity of the Aero Club and the Flying Club combined.

7. To abolish the present fair and equitable constitution and by-laws and the present democratic principle of election of Governors and of officers by the members of the Club and abolish the present Board of 24 Governors in the absence of most of them, on account of Summer vacations, by means of a fake meeting and adoption of despotic by-laws, place the Club in the hands of three individuals who have made secret and unlawful agreements with the agents of the Manufacturers Aircraft Association to merge the Aero Club of America with the American Flying Club, which is managed and controlled by the agents of the Manufacturers Aircraft Association.

8. To suppress the Aero Club of America as a national moral force, which it has been for eight years, and enable the confederates of defendants to use the name of the Club as a shield during the coming U. S. Attorney General Investigations.

9. To obtain apparent authority for these pernicious activities by misrepresentations set forth in the affidavits and by holding a so-called Special Meeting of the Club on August 16th, 1920, and to carry out the above mentioned schemes by taking advantage of the absence of many Governors and members of the Club.

Judge Glennon reserved decision pending the receipt of additional affidavits to be filed on behalf of plaintiff, said affidavits to be filed in Court by four o'clock Monday.

Counsel and Secretary of the Club Ordered by Acting President of Club, Who is a Defendant, to Act for Defendants

The counsel for the defendants is in a peculiar position. Like the Secretary of the Club, he has been ordered by Charles Jerome Edwards, the acting president of the Club, who is a defendant in this action, **to act for the three defendants named in this action as conspirators to wreck the Club!**

The defendants took advantage of the absence of eighteen of the members of the Board of Governors and by violating the written and unwritten laws which govern the affairs of membership organizations, they prevented the remaining members of the Board from learning of the purpose of this action and from seeing the contents of the affidavits filed in this action. Therefore the Governors could not direct and instruct the counsel and the secretary of the Club as to the policy to be followed in this action. A request from two members of the Board, to have the case and evidence submitted to the members of the Club and secure the opinion and votes of the members on the questions involved was suppressed by the acting president at the meeting of July 21st.

Additional Affidavit Gives Evidence That Governors' Names Were Used Without Authority

In the additional affidavit submitted to the Court by plaintiff on August 2nd, through Nugent & Nugent, Attorneys, which gives conclusive evidence, covering two hundred legal folios, evidence is submitted that the names of Governors and members of the Club are being used by the defendants without authority.

The affidavit of Mr. Woodhouse reads in part as follows:

STATE OF NEW YORK, } ss.:
COUNTY OF NEW YORK, }

Henry Woodhouse, being first duly sworn, deposes and says: That he has read the verified answers of defendants, their joint affidavits and various affidavits and exhibits submitted by these deponents in opposition to plaintiff's motion for an injunction pendente lite restraining these defendants from consummating their illegal designs and conspiracy to subject the Aero Club of America to the control of the American Flying Club and the Manufacturers Aircraft Association, and thereby compelling it to submit to their pernicious influences and selfish schemes and desires.

Deponent submits that the aforesaid affidavits and papers are replete with misrepresentations, scurrilous and veiled attacks upon this deponent and abound with the reckless use of extravagant and high-sounding language, loose generalities, personal aspersions and desperate efforts to becloud the real issues in this controversy and create, so far as possible, an atmosphere tending to prejudice the mind against deponent.

It is to be observed that these defendants in their joint affidavits and elsewhere claim to have submitted their specified schemes to and having received the approval of a majority number of members of the Board of Governors and of a number of members of the Club, whose names they quote as being in favor of said schemes. These claims are untrue, and although defendants have kept their schemes secret and have misrepresented their purposes, a number of Governors and members of the Club have discovered their ruses and have combined themselves into a Committee For The Protection of The Legal, Financial and Moral Rights of the Members of the Aero Club of America, who join plaintiff in seeking the relief prayed for in this action.

In the short space of time available since receipt of defendants' affidavits plaintiff could only communicate with a few of the Governors whose names are quoted by defendants as being in favor of their schemes and the replies he has received prove conclusively that defendants are quoting the Governors without their knowledge. Mr. George M. Myers, an active member of the Board of Governors since the year 1911, has written the defendant the following letter:

"Kansas City, Mo., July 29, 1920.

Mr. Henry Woodhouse,
280 Madison Ave.,
New York City.

My dear Mr. Woodhouse:

Your favor of July 27th received. From what I know of the proposed consolidation between the Aero Club of America and the Flying Club, I would surely be against any consolidation of any kind, nature or description. However, I will be in New York City next week, and hope to see you at that time and will discuss the subject further.

I am sure nothing can be accomplished without first laying the whole proposition squarely and honestly before the members of the Aero Club, and at this writing it is my judgment the Aero Club better remain as it is, but as above stated, I hope to see you in New York week of August the 2nd and will discuss the matter further with you.

With best wishes, beg to remain,

(sgd.) George M. Myers."

Rear-Admiral Bradley A. Fiske, U. S. N. (retired), whose name is quoted by defendants, during his absence as being in favor of defendants' schemes, at the meeting of the Executive Committee of the Aero Club of June 22nd, 1920, voted for a resolution which was adopted, reading as follows:

> **"That further action over the proposed plan for amalgamation with the American Flying Club be and is hereby definitely postponed and the Committee discharged with thanks for the valuable services rendered the Club."**

Defendants used, without authority, the name of Mr. Alan R. Hawley, another member of the Board of Governors of the Club, on proxy forms for the fake meeting being called by defendants for August 16th, 1920, and when Mr. Hawley discovered said misuse of his name he protested and defendants were compelled to reprint the proxy forms.

Defendants fail to state that Major Granville A. Pollock, another member of the Board of Governors whose name is quoted by them, has given his proxy to Major Charles J. Glidden, another member of the Board of Governors of the Club who has protested and is against defendants' schemes, and has been grossly misquoted and his views misrepresented by defendants.

The Notice That Caused Starting Legal Action

Section 11 of the Membership Corporation Law of the State of New York, reads as follows:

> **"The directors of every membership corporation... shall be jointly and severally liable for any debt of the corporation contracted while they are directors, payable within one year after the debt becomes due, and an execution issued therein to the county where its office is, or where a certificate of its incorporation is filed, be returned wholly or partially unsatisfied, and if the action against the directors to recover the amount unsatisfied be commenced within one year after the return of such execution."**

Under this law members of the Board of Governors are liable for the Club's debts. The members of the Club are liable to the assessment of one year's dues.

On July 14th, 1920, Henry Woodhouse and Major Charles J. Glidden received a letter signed by Charles Jerome Edwards, acting president of the Aero Club of America, in which he stated that arrangements had been made to take over the American Flying Club and other liabilities. Mr. Edwards stated that said letter had been sent because Mr. Woodhouse, Major Glidden, and other members, had been asking questions about some secret negotiations which had been conducted with the American Flying Club about which, especially regarding

(*Continued on page* 745)

THE NEWS OF THE WEEK

JL Monoplanes Reach Omaha On Trans-Continental Trip

Three of the JL-6 all metal monoplanes left Central Park, L. I., on July 30, on the first transcontinental aerial mail flight. As we go to press all of the planes had reached Omaha, Neb. The flight of the first plane between Chicago and Omaha took four hours and eleven minutes. Stops have been made at Cleveland and Chicago, and the scheduled stops after Omaha are Cheyenne, Salt Lake City, Reno and terminating in San Francisco.

An elaborate aerial ceremony marked the start of the momentous flight. Eleven other aeroplanes took the air and circled around, while the three monoplanes were climbing for altitude, while on the ground a crowd of army officers and civilians watched the start.

On board were about 100 pieces of mail, a very modest beginning for what is to be the world's longest and one of the most important aerial mail routes. Most of the letters were special delivery from New York, while others were from Otto Praeger, Second Assistant Postmaster-General in charge of air mail, to the Mayors of Cheyenne, Salt Lake City and San Francisco, and to various chambers of commerce along the route.

No attempt was made to break speed records on this flight, it was said. Particular attention will be paid to the airway between Omaha and the coast, which for aerial mail purposes has not yet been charted. The flight is being conducted under the auspices of the Post Office Department, the United States Air Service and Mr. Larsen.

Announcement already has been made by Assistant Postmaster General Otto Praeger that through coast-to-coast aerial mail service will be instituted in the first week of September. Before that time Omaha and San Francisco will be linked under the Post Office Department's plan.

Following is a list of the personnel of the expedition:

Plane No. 1—Pilot H. T. Lewis, of the Air Mail Service; Capt. Harold E. Hartney, head of the department of training, U. S. Army Air Service; Mayor Leon B. Lent, General Superintendent of the Air Mail Service, and Capt. Edward Rickenbacker, his assistant. This plane is owned by the army and is being "ferried" across the country to be used in forestry patrol on the west coast.

Plane No. 2—Pilot Mons Emil; John M. Larsen, designer of the all-metal monoplane; E. E. Allyne, aluminum manufacturer of Cleveland, and Ernest Buhe.

Plane No. 3—Pilot, Bert Acosta; Gould Dietz, President of the Aero Club of Nebraska; Lieut. Charles P. Colt; William B. Stout, of Detroit, designer of the "batwing" type of aeroplane, and John Bockhorst, a motion picture photographer.

Christen Gordon Bennett Cup Racer

The specially built Curtiss monoplane, with which it is hoped to win for America the 1920 James Gordon Bennett air races to be held in France from September 27 to October 3, this year, was christened The Texas Wildcat recently at Hazelhurst Field, L. I., as Mrs. S. E. J. Cox, wife of the Houston, Texas, oil man, who ordered the construction of the machine, broke a bottle of real champagne over the nose of the propeller spinner.

The machine is being entered by S. E. J. Cox, under the auspices of the Aero Club of Texas. The order was given to the Curtiss Airplane Company two months ago. Its construction has been materially affected owing to the lack of information concerning the rules of the Gordon Bennett race this year. The Aero Club of America, the official representative of the Federation Aeronautique Internationale, has not been able to obtain these rules, which places the American entries under a distinct handicap.

The temporary test wings on the plane have a wing spread of thirty-two feet, but the permanent wings will be only twenty feet over all. The length of the monoplane is twenty feet. It is equipped with a 400 horsepower engine.

Roland Rohlfs, who held the world altitude record until beaten by Major Schroeder and Clarence Coombs, winner of the race around the Statue of Liberty and other aerial contests, will pilot the Texas Wildcat in the Bennett races.

The "Texas Wildcat," the entry of the Texas Aero Club in the Gordon-Bennett Race. In the photo are: Pilot Clarence Coombs, Pilot Roland Rohlfs and Mr. S. E. J. Cox, the owner of the plane

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Plan First Flight Around the World

The special commission appointed by the Aero Club of America and the Aerial League of America made a visit to many countries which included a circling of the globe and has completed an organization making possible the conducting of the first aerial derby around the world.

To ascertain the exact conditions existing a test flight around the world is contemplated. A Handley Page aeroplane, type W-8, will be used, which is an improvement on the class of aeroplanes now used in the regular service between London and Paris and London and other points in Europe, this aeroplane to be piloted by two of America's well known and most experienced aviators.

The test flight will start from London, the aeroplane moving to the east. Aerodromes and landing fields are now in existence over the entire route from London to Tokio and from Seattle to New York with suitable other landing conditions at points where stops may be advisable or made necessary. Complete details of this test flight including the route, distances, etc., and the cost of transportation is in course of preparation.

The capacity of the aeroplane to be used on this test flight is ten passengers and it is proposed to divide the expense of the trip equally among the ten who may care to participate. Should the number of passengers making the trip be less than ten the expense to each passenger would increase in proportion.

Tentative Route Around the World

New York to Seattle	2929 miles
To Yokohama via Aleutian Islands (landing places every 150 miles)	5418 "
Shanghai	1266 "
Bangkok, Siam	2095 "
Karachi, India (via Rangoon, Calcutta and Delhi)	2563 "
Bagdad	1532 "
Rome (via Greece)	1876 "
Ireland (coast) (via Paris and London)	1528 "
Newfoundland	1875 "
New York	1125 "
Total	22.207 miles

The route via the Azores, Madeira, Gibraltar, Cairo to Bagdad, reduced the Atlantic Ocean hop from 1875 to 1060 miles, and does not increase the distance. It also avoids the congested points in Great Britain, France, Italy and Greece.

Draw Plans for Trans-Continental Race

The transcontinental flight National Aeroplane Race for the Pulitzer Trophy and other prizes to be announced, from Hazelhurst Field, Mineola, Long Island,

N. Y., to Varney Field, San Francisco, Cal., is open to all aviators of the world holding brevet of the Federation Aeronautique Internationale and annual flying certificates of the Aero Club of America or an affiliating club of the Federation.

Tentative conditions for the race to be held in November were made public recently by Major Charles J. Glidden, Acting Chairman of the Contest Committee of the Aero Club of America, which will conduct the race. The Contest Committee has held a meeting to formulate rules to govern the flight and will do everything in its power to insure the safety of the aviators who will participate and the success of the race.

The aviator wins the trophy who during the month of November, 1920, makes the best flying time between the two points mentioned, flying over any route selected by him, but following as far as practicable the route of the United States Aerial Mail Service.

He may select his own date and time of flight between points, provided the Contest Committee are advised in season to arrange with their referees to note the time of starting and landing.

Time will be taken when the aeroplane starts and when it stops on the designated field of landing.

The contest as far as it will be possible to make it will be in the nature of a touring race in which any qualified aviator may participate, thereby minimizing accidents and yet ascertaining the fastest flying time that can be made in a flight across the continent over a route chosen by the aviator and under the best possible conditions existing with a view of advancing aviation in a practicable way and one that many amateurs and professionals may enjoy in the future as is now done in sane, sensible automobiling in all parts of the world.

Conditions arising not covered by the above suggestions will come under the general rules of the club applicable to aeroplane contests.

The points involved in the above have been under consideration by the officials connected with the First Aerial Derby Around the World, as practicable in connection with the great International event.

Cincinnati Aero Club Holds Banquet

The Cincinnati Aero Club recently gave a very successful banquet at the Zoological Garden Club House, Cincinnati. The event was presided over by John H. Stewart, president of the club; John E. Hendrixson, secretary, and Messrs. Cornelius Hauck, Thomas Stevenson and Morris Wachtel as the entertainment committee. An excellent dinner was served and a very interesting program took place. A large attendance enjoyed the affair and much interest was aroused in aviation affairs.

The Pan-American Aeroplane Exchange, distributors of the Aeronautic Library of Cincinnati, furnished the decorations.

Fifteen to Start in Balloon Tryout

A complete list of entries for the national balloon race which will be started from Indianapolis on September 11 has been announced by Major Charles R. Glidden, Acting Chairman of the Contest Committee of the Aero Club of America. According to present plans there will be fifteen starters in the contest, which will act as an elimination race for the international balloon race, which will start at Indianapolis on October 23.

The following are the entries: Three balloons entered by the United States Army Air Service, officered by Capt. Dale Babry, Lieut. Byron T. Burt, Lieut. Robert S. Olmsted, Lieut. George W. McIntire, Lieut. Richard E. Thompson and Lieut. Harold E. Weeks; one balloon entered by the Navy, which will be piloted by Lieut. Raffe Emerson, and balloons piloted by A. Leo Stevens, United States Army Balloon School at Fort Omaha; Ralph H. Upson, Akron, O., present holder of the international trophy; H. F. Honeywell, Clayton, Mo.; William A. Assman, representing Little Rock, Ark.; J. S. McKibben, St. Louis; E. S. Cole, St. Louis; Roy F. Donaldson, Springfield, Mo.; Arthur C. Hoskins, St. Louis; Capt. J. M. Reilly, St. Louis; Bernard von Hoffman, St. Louis, and Warren Rasor, Brookville, O.

In the international race there will be eleven entries, three from the United States, three from Italy, three from France, one from Great Britain and one from Belgium.

Predict U. S.-Germany Aerial Service

All the newspapers in Berlin, Germany, give prominence to a statement made by Herr Colsmann, head of the famous Zeppelin factory at Friedrichshaven, that, as a result of his visit to the United States, whence he has just returned, prospects for the establishment of a regular airship service between Germany and America are very bright.

The management of the Zeppelin factories say that their latest type of airship would be able to transport 500 passengers with heavy luggage from Hamburg to New York in forty-five hours.

Aerial Derby at Galveston, Texas

The South's first Derby of the Air staged over Galveston Bay was the brilliant feature of the Independence Day festivities. Fully 50,000 persons cheered as Aviator R. R. McCabe flashed across the finish line in front, culminating a tail-on pursuit in which he had successively overhauled one after the other of his rivals. The winner's time over the 50-mile triangular course was 51 minutes, 59 seconds.

The winner drove a Curtiss-Standard aeroplane of S. E. J. Cox, millionaire Houston oil man of the Texas Aero Club, who will enter a machine for the Gordon Bennett Cup to be contested in France in September. McCabe is the successful pilot who last year figured in Mrs. Cox's sensational flight across country, taking her son from her Houston home to the boy's Hudson River school above New York.

N. B. Ison, veteran aviator, also of Houston, finished second to the Cox entry in 54 minutes, 28 seconds; H. W. Cleveland, third, and D. L. Joscelyn, fourth. Each contestant drove a Curtiss-Standard.

At 45 seconds interval, the contestants took off for the start and McCabe was last away, the order of the other three being Cleveland, Ison and Joscelyn.

Cleveland's lead was early threatened in the second lap, Ison marching steadily up to give him the struggle for first place. At the closing of the fourth lap Cleveland held the inside of the course with Ison leading by only a matter of feet. By a swift dive Cleveland put out in front again, but his advantage was momentary, as Ison heat him on the next leg to windward.

Meanwhile the Cox aeroplane was going at a faster rate than any of the others. Joscelyn was passed early and while McCabe still trained Ison and Cleveland in matter of position his time was better than theirs when the race was only half over.

Entering the sixth lap, McCabe shot out to catch the leaders. By the seventh lap he had passed Cleveland, and entering the eighth, he passed Ison.

The Cox plane led by 500 yards, coming into the ninth lap and finished leading by 2 minutes and 29 seconds, with Joscelyn then a full lap behind.

Prizes presented by the Galveston Beach Association were awarded by Mayor H. O. Sappington and Major E. J. O'Connell, Commandant of Ellington Field: $500 to the winner and $250, $150 and $100 to the others in the order of their finish.

The personnel of the three JL all-metal monoplanes which left Central Park Field, Long Island, on a trans-continental flight to San Francisco. In the group are: John M. Larsen, president of the JL Aircraft Corporation; Gould Dietz of Omaha, Nebr.; E. E. Allyne of Cleveland; Major L. B. Lent, Supt. of the Aerial Mail Service; Wm. B. Stout of Detroit; Capt. Ed. V. Rickenbacker; Lieut. Charles R. Colt; John Bockhurst; Ernest Bull, and pilots Capt. Harold E. Hartney, Emil Mons and Bert Acosta © International

The AIRCRAFT TRADE REVIEW

Avro Plane Makes Good Cross-Country Trip

A successful flight from Hazelhurst Field, Long Island, to Helena, Ark., was made recently in a three-seater Avro aeroplane by M. J. Dixon Davis, president of the Southern Aerial Corporation, accompanied by C. S. MacDonald, of the Interallied Aircraft Corporation, as far as Cleveland, Ohio.

They left Hazelhurst Field at 6 A. M. and landed two hours later at Honesdale, Penn., on the golf links for gas. High test gasoline was available and plenty of co-operation from the local residents was tendered them. Leaving Honesdale at 1 P. M. they reached Hammondsport, N. Y., at 3.45 P. M., on the field of the Aerial Service Corporation. Excellent service was rendered at Hammondsport and they felt well rewarded for going slightly off their route and landing there.

They left Hammondsport the next morning and on account of a bad storm landed near Franklinville, N. Y. In the afternoon they continued their flight and landed at Dunkirk, on the golf links, as they ran into another bad storm. The following day the trip was continued and Cleveland was reached in two and a half hours.

Mr. Davis continued his trip alone from Cleveland to Louisville, and from Louisville to Helena, Ark., where he is now using the Avro. The total flying time from New York to Louisville was only 12½ hours.

Titanine Expands Organization

Titanine, Inc., one of the first firms to manufacture non-poisonous dope in England, and active in America for the last three years, are contemplating the expansion of their organization in America to take care of the increased business which will occur with the development of commercial aeronautics.

Recently Mr. D. C. Hutchinson, of the London headquarters of the firm, has made an extended tour in the United States and he is convinced that in America lies the future of commercial aeronautics and his company is preparing to meet the demands which they anticipate next year.

In order to speed up deliveries and obviate the delay of transmission from the office to the works the company has transferred its executive offices to the works at Union, N. J., where Mr. E. G. Davis, the general manager, will have every department under his immediate control.

Lincoln Standard Plane Flies From Denver to Salt Lake City

An excellent flight from Denver, Col., to Salt Lake City, was recently made by one of the Lincoln Standard J-1 aeroplanes, owned by the Martin-Sweet Motor Company of Denver, Col., distributors of Lincoln-Standard aeroplanes.

The Lincoln Standard J-1, equipped with a 150 H. P. Hispano-Suiza engine and piloted by Lieut. Eddie Brooks, left the Martin-Sweet Motor aerodrome, Denver, Col., and headed straight west across the Rockies, crossing the range at Corona, which is the highest point reached by the Moffat Line Railroad, at an altitude of 16,000 feet. A landing was made at Kremling, Col., 125 miles from Denver, in an hour and fifty-five minutes.

From Kremling Pilot Brooks went to Glenwood, through Gore Canyon, a distance of seventy-five miles, in fifty-five minutes; from Glenwood to Grand Junction, Col., one hundred miles, in fifty minutes; Grand Junction to Green River, Utah, seventy-five miles, in forty minutes; Green River to Price, Utah, fifty miles, in forty minutes; Price to Salt Lake City, crossing the Wasatch Range at Soldier Summit, one hundred twenty-five miles, in an hour and fifty minutes.

The return trip was made by way of Ogden, Utah; Evanston, Wyo.; Green River, Wyo.; Laramie and Cheyenne, Wyo.

Campaigning for the Governorship of Missouri. E. E. E. McJimsey, the candidate, seated in the plane. Left to right: Warren Sanders, Wm. A. McAtee, Frank Wightman, Pilot Ralph Suavely, McJimsey boosters

Ralph C. Diggins Flying School Active

The Ralph C. Diggins Flying School, operating at the Ashburn Aerodrome, has been very active during the spring and summer classes. The continual flying and buzzing about of students reminds one of the flying fields during the war. Keen interest is shown by pupils both for flying and mechanical work. It has been noticed that a number of graduates have purchased ships and are now operating them throughout the country. Messrs. Burmeister and Horton are also active in the same aerodrome, while the James Levy Aircraft Company is demonstrating and delivering Avros as fast as they can be set up. Supplies and service can be secured at all hours on the aerodrome and people in transit are invited to avail themselves of the use of the field and municipal hangar.

Flying Boat at Auburn, N. Y.

The Finger Lakes Air Line Corporation has started a flying boat service at Auburn, N. Y. An HS2L flying boat is being operated on Lake Owasco and nearby lakes.

The aero service is extremely popular and many trips have been made by parties over the Finger Lakes region. Messrs. George Leonard and Mortimer Blaiser are the owners of the company. Pilot Todd is doing the flying for them.

Aerial Service at Waterloo, Indiana

The Waterloo Aero Transportation Company has been organized at Waterloo, Ind., to give exhibition flights, passenger carrying service, aerial advertising and other commercial aviation work.

A very good landing field has been obtained near Waterloo and a service station for aeroplanes is to be established.

De von Bartholomew, one of the pilots of the new company, recently took his grandfather, who is eighty-seven years old, for a flight. The old gentleman was delighted with the trip and is very enthusiastic about aerial touring.

Orvar Meyerhoffer, Aviation Pioneer, Dies

Orvar Meyerhoffer, one of the early pioneers of aviation on the Pacific coast, died recently from injuries received when he was struck by the propeller of his aeroplane at McArthur, Shasta County, Cal.

Meyerhoffer, or "Swede," as he was known to all the old timers of aviation, was one of the first to enter the flying game and he shared honors with Paulan and other early French flyers at the first meet in San Francisco.

Meyerhoffer was the first aerial policeman in the world, being appointed to this position by the Chief of Police of Venice, Cal., in 1912. One of his most notable feats was the altitude record he established in Los Angeles in 1916. Flying a Curtiss pusher, equipped with 60 horsepower motor, he climbed 19,000 feet over the city.

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, General Superintendent, Air Mail Service
Herbert Blakeslee, Assistant Superintendent
John A. Jordan, Chief of Construction

J. Clark Edgerton, Chief of Flying
Charles I. Stanton, Chief of Supplies and Maintenance
Carleton A. Parker, Assistant Chief of Maintenance
George L. Conner, Chief Clerk
John A. Willoughby, Operator in Charge of Radio Experiments

Eugene Sibley, Operator in Charge of Radio Maintenance and Operation

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt
Frederick A. Robinson
Walter J. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris

Duard B. Colyer, Acting Superintendent, New York-Washington Division
Samuel F. Doane, Superintendent, New York-Cleveland Division
Walter H. Riddell, Superintendent, Cleveland-Chicago-Omaha Division
E. W. Majors, Superintendent of Repairs, Bustleton, Pa.
Eugene J. Scanlon, Manager, Air Mail Warehouse, Newark, N. J.
Paul W. Smith, Manager, Newark, N. J.
Maurice J. Kelly, Manager, Bellefonte, Pa.
Howard F. Salisbury, Manager, Cleveland, O.
Andrew R. Dunphy, Manager, Chicago, Ill.
William I. Votaw, Manager, Omaha, Neb.

PILOTS

Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen
Elmer C. Nichols
John J. McLaughlin
Harry Huking
Glenn V. Conrad
Irving Murphy
Claire K. Vance
Homer W. Johnston
William N. DeWald
Clarence C. Lange
William C. Hopson
W. J. McDonough
D. A. Martin

Plan New York-San Francisco Aerial Mail

The initial trip of the Aerial Mail Service from New York to San Francisco is expected to be made during the first week in September. The exact date of the inauguration of this service, Second Assistant Postmaster General Praeger says, is contingent only on the completion by Cheyenne, Salt Lake and Reno of their landing fields and hangars. These cities have already procured the fields and let the contracts for the hangars, and it is expected that they will be ready on time.

The first leg of the New York and San Francisco route, terminating at Omaha, will be flown in all-metal (aluminum) planes. The leg from Omaha to San Francisco wil be equipped with De Haviland planes.

Plan Aerial Mail Service from Seattle to Victoria, B. C.

Official sanction has been given to the plan by which mail will be carried from Seattle to Victoria, B. C., the first international mail service by air in North America.

Mail for the Orient will be carried under contract from the Boeing Airplane Company's hangar on Lake Union, Washington. The service will connect with the liners at the Canadian port with postal matter received at the Seattle office after the departure of the boats from Seattle.

UNITED STATES POST OFFICE DEPARTMENT

NEW YORK-CHICAGO ROUTE—AIR MAIL SERVICE

Monthly Report of Operation and Maintenance, April, 1920

													SERVICE AND UNIT COST					
Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	Gallon of Gasoline	Total Time Run hr. min.	Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
60	$1.78	$0.19	$103.22	$39.85	$22.10	$61.92	....	$72.27	$1.16	$50.00	$102.56	$455.05	6	....	....	....	....	.....
66	....	....	103.22	39.85	22.10	61.92	....	112.69	....	50.00	102.56	492.34	.....	....	....	....	....	.....
67	....	....	103.22	39.85	22.10	61.92	....	336.97	8.85	50.00	102.56	725.47	.....	....	....	....	....	.....
70	....	....	103.22	39.85	22.10	61.92	....	5.16	....	50.00	102.56	384.81	.....	....	....	....	....	.....
74	155.78	17.22	103.22	39.86	22.10	61.92	$142.20	166.63	1.16	50.00	102.56	862.65	556	16 10	1,400	2.5	$53.36	$0.62
75	1.78	.19	103.22	39.86	22.10	61.92	....	212.24	494.61	50.00	102.56	1,088.48	6	....	....	....	....	.....
76	159.51	24.46	103.22	39.86	22.10	61.92	185.00	445.53	10.41	50.00	102.56	1,204.57	573	21 02	2,125	3.7	57.26	.57
79	287.83	43.94	103.22	39.86	22.11	61.92	365.33	354.11	44.20	50.00	102.56	1,475.08	1,026	41 32	4,000	3.9	35.51	.37
80	....	....	103.22	39.86	22.11	61.92	....	76.09	....	50.00	102 56	455.76	.....	....	....	....	....	.....
85	....	....	103 22	39.86	22.11	61.92	....	161.04	100.26	50.00	102.56	640.97	.....	....	....	....	....	.....
88	....	....	103.22	39.86	22.11	61.92	....	272.01	32.15	50.00	102.56	683.83	.....	....	....	....	....	.....
89	333.36	56.69	103.22	39.86	22.11	61.92	342.02	391.48	425.44	50.00	102.56	1,928.66	1,183	38 53	4,385	3.7	49.60	.44
91	221.58	25.37	103.22	39.86	22.11	61.92	180.76	177.28	1.16	50.00	102.56	985.82	791	20 33	1,800	2.3	47.97	.55
92	....	....	103.22	39.86	22.11	61.92	....	28.20	311.07	50.00	102.56	718.94	.....	....	....	....	....	.....
94	84.56	9.16	103.22	39.86	22.11	61.92	40.32	288.48	1,253.98	50.00	102.56	2,056.17	293	4 35	325	1.1	448.61	6.33
95	242.81	32.11	103.22	39.86	22.11	61.92	171.67	555.26	4,208.33	50.00	102.56	5,589.85	788	19 31	1,814	2.3	286.41	3.08
97	....	....	103.22	39.86	22.11	61.92	....	11.42	....	50.00	102.56	391.09	.....	....	....	....	....	.....
98	256.66	18.09	103.22	39.86	22.11	61.92	202.60	226.98	31.82	50.00	102.56	1,115.82	507	23 02	1,882	3.7	48.44	.59
99	141.96	11.62	103.22	39.86	22.11	61.92	108.04	280.98	2,018.27	50.00	102.56	2,940.54	567	12 17	892	1.6	239.39	3.30
101	358.02	42.71	103.22	39.86	22.11	61.92	318.71	428.14	2,924.51	50.00	102.56	4,451.76	1,269	36 14	3,200	2.5	122.86	1.39
102	433.19	70.91	103.22	39.86	22.11	61.92	616.01	361.09	4.00	50.00	102.56	1,864.87	1,525	70 02	6,005	3.9	26 63	.31
103	11.72	2.29	103.22	39.86	22.11	61.92	19.35	172.56	351.16	50.00	102.56	936.75	42	2 12	240	5.7	425.79	3.90
104	291.14	45.81	103.22	39.86	22.11	61.93	334.28	343.76	11.62	50.00	102.57	1,406.30	1,047	37 59	3,790	3.6	37.02	.37
105	....	....	103.22	39.86	22.11	61.93	....	12.70	....	50.00	102.57	392.39	.....	....	....	....	....	.....
106	....	....	103.22	39.86	22.11	61.93	....	5.16	....	50.00	102 57	384.85	.....	....	....	....	....	.....
107	396.19	48.21	103.22	39.86	22.11	61.93	407.67	281.15	93.16	50.00	102.57	1,606 07	1,400	46 14	4,150	3.0	34.73	.39
201	59.88	12.00	103.22	39.86	22.11	61.93	....	97.50	28.50	200.00	102.57	727.57	203	....	....	....	....	.....
202	65.78	12.00	103.22	39.86	22.11	61.93	....	97.50	28.50	200.00	102.57	733.47	223	....	....	....	....	.....
204	30.23	12.00	103.22	39.86	22.11	61.93	....	91.76	28.50	200.00	102.57	692.18	133	....	....	....	....	.....
206	68.73	12.00	103.23	39.86	22.11	61.93	....	92.08	30.50	200.00	102.57	733.01	233	....	....	....	....	.....
44302	4.58	.19	103.23	39.86	22.11	61.93	8.06	73.52	1.16	35.00	102.57	452.21	16	00 55	60	3.8	....	.....
Total	$3,607.07	$497.16	$3,199.84	$1,235.62	$685.34	$1,919.61	$3,442.02	$6,231.74	$12,444.48 †	$2,135.00	$3,179.45 *	$38,577.33	12,387	391 11	36,068	2.9	$98.62	$1.07

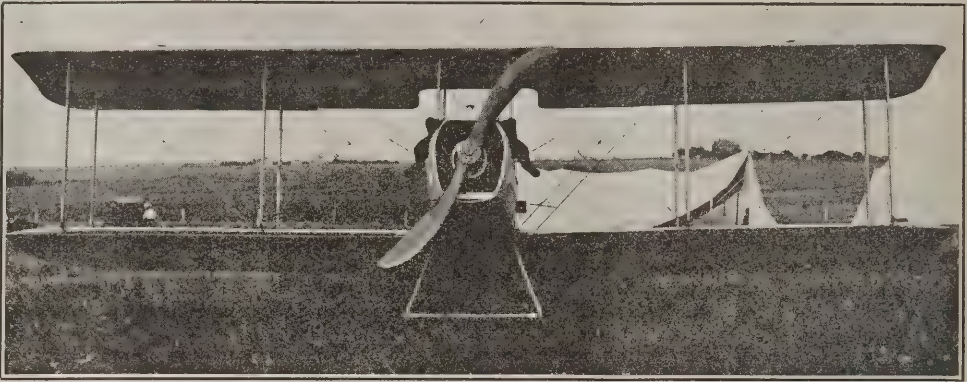
Cost of assembling one Liberty 12 motor from salvage and spare parts, to be placed in stock, $1,103.02.
Cost per mile, overhead, $.29; cost per mile, flying, $.21; cost per mile, maintenance, $.57.
Note.—Planes Nos. 60 to 107, inclusive, De Havilands, equipped with Liberty 12 motors.
Planes Nos. 201 to 206, inclusive, Martins, equipped with two Liberty 12 motors.
Plane No. 44302, Curtiss JN4D, equipped with Curtiss OX5 motor.

*Includes $320.62 covering work preliminary to the inauguration of service between Chicago and Omaha.

†Includes cost of rebuilding four De Haviland planes.

OTTO PRAEGER, Second Assistant Postmaster General

THE LINCOLN STANDARD SPEEDSTER



Front view Lincoln Standard Speedster

The latest product of the Nebraska Aircraft Corporation of Lincoln, Neb., is the Lincoln Standard Speedster. This aeroplane was developed for long cross-country cruising, to possess a high cruising speed with six hours' duration and also combine extreme maneuvering ability and ease of control. As a three-place plane, the Speedster has a very creditable performance and possesses an unusually high factor of safety. Exhaustive practical use has demonstrated that the installation of the 150 or 180 Hispano-Suiza motor makes a most desirable and efficient combination of motor and plane.

Fuselage

The fuselage is arranged with the pilot's seat in the rear and a double seat for two passengers in the front. The fuselage is 32 inches wide and has ample room for two without staggering the seats, thereby not interfering with the dual control provided. An oval-nose radiator leads the fuselage and is suspended on a steel tube and wood longeron framework trussed with No. 8 piano wire, double. The radiator also is provided with shutters for winter use. Quick detachable cowls are provided to make the motor easily accessible; also large doors are provided for slight repairs and inspection. The turtle deck is of sheet aluminum, and the rear of the box-girder fuselage is covered with linen. The tail skid extends through the bottom of the fuselage, and the shock absorbers are easily accessible. The landing gear is very rugged and is made in two types, steel tubing and wood. A convenient baggage compartment is built in the fuselage at the rear of the pilot's seat. The finish of the fuselage is turquoise blue front and silver rear, striped with dark blue.

Wings

The overall span of the wings is 32 feet, with a chord of 6 feet, giving a total area of 350 square feet. The characteristics of the wing section, R. A. F. 3, prove advantageous for climbing rather than for speed. As one curve is as desirable as the other for commercial flying, the use of the R. A. F. 3 makes possible a good compromise. The wings are swept back 3 degrees, thereby permitting the wing roots to be located sufficiently forward to allow the passengers' compartment to be located rear of the center section struts, cross wires and other interferences that are usually encountered in straight wing planes when attempting to locate the passengers at the center of gravity.

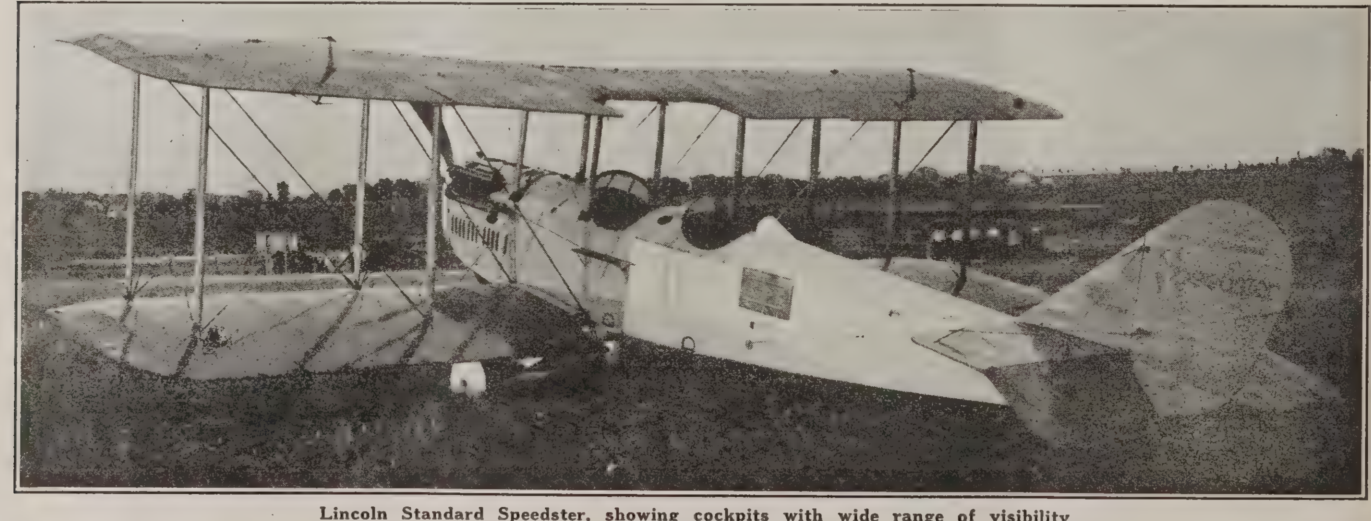
Vincent J. Burnelli, chief engineer of the Nebraska Aircraft Company

Ailerons are on the top wing and have an area of 18 square feet each, being 9.75 per cent of the total area. Generous cutaways to improve vision are located in the wings at the fuselage section. At maximum speed the top wing carries 80 per cent of the load. The tail surfaces are very generous in area, the span and chord of the tail being 10¾ x 5 feet 5 inches.

Power Plant and Instruments

The motor installation of the 180-H.P. high-compression or 150-H.P. Hispano-Suiza is very efficiently and accessibly arranged. The motors are of dry sump, and an oil cooler and reservoir is located directly under the motor, the same being washed with air coming through vents in the bottom. Pressure-gas system is used from the 60-gallon tank through the use of the motor air pump. Sufficient cooling surface is provided on the nose radiator, which has a 4-inch G and O core to permit an average running temperature of 85 degrees centigrade. Either long silencer exhausts or manifolds with sweeps are provided. The propeller is a Hamilton 8 feet 3 inches diameter by 6.5 feet pitch, turning 1,650 maximum. For starting, a booster magneto is used from the pilot's seat. A complete set of instruments is located on the pilot's dash. The front dash has instruments that are of interest to the passengers.

Compared with the Tourabout model, the Speedster excels in performance and efficiency, though the take-off and landing speed shows an increase of 6 M.P.H., requiring about 15 per cent more run

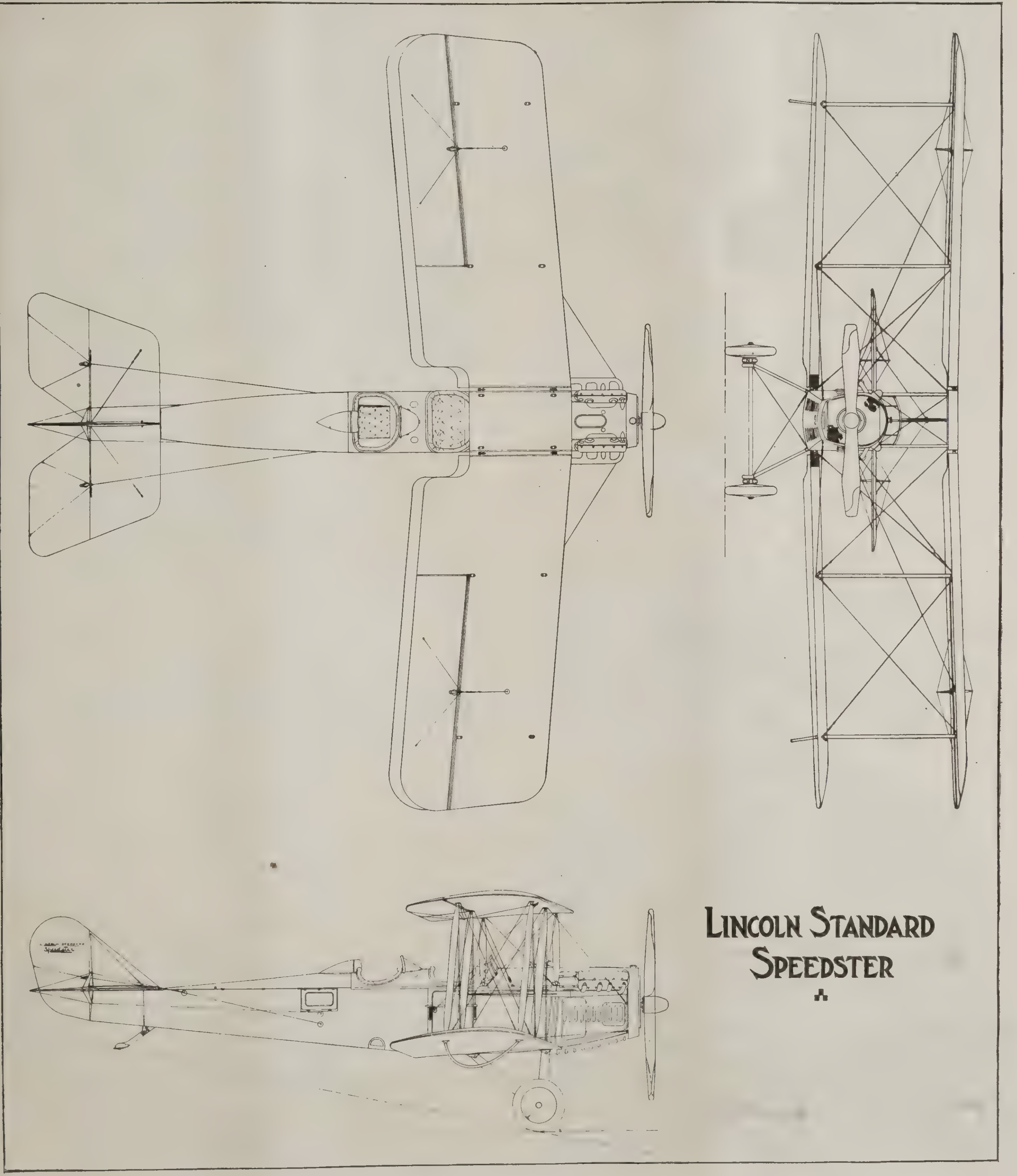


Lincoln Standard Speedster, showing cockpits with wide range of visibility than the Tourabout, which is remarkable in rapid acceleration, getaways and climb. The Speedster has a maximum speed of 107 M.P.H. and a cruising speed of 95 M.P.H.; landing speed 46 M.P.H. The climb with two passengers is 5,100 feet in ten minutes. The performance referred to is for the 180 Hispano installation. The 150 Hispano gives a better performance in proportion to the horsepower absorbed.

The Speedster was developed by Vincent Burnelli, chief engineer and factory superintendent of the Nebraska Aircraft Corporation. Mr. Burnelli's broad experience as an aeronautical engineer qualifies him for his responsible position. In the past seven years he has been associated with many aviation enterprises, as designing engineer for the A. B. C. Airplane Company, also at the time working on the development of a flying torpedo with an arrangement to release the pilot with a parachute shortly before encountering its target—namely, a rigid airship. This work was done for Capt. Blackwood of the Royal British Navy and received much consideration abroad. For eight months civilian engineer at the Washington Navy Yard Wind Tunnel, working out data for rigid airship design, as well as data pertaining to aerofoil design; for six months chief engineer of the International Aircraft Company of New York; chief engineer and factory superintendent, Continental Aircraft Company for two years; consulting engineer for the Lawson Aircraft Company, Green Bay, Wis., and for eight months engineer and superintendent of the Lawson Airline Company, Milwaukee, and for the past eight months with the Nebraska Aircraft Corporation.

Characteristics of Lincoln Standard Speedster

Length overall	25′ 8″
Height overall	10′
Span	32′
Chord	6′
Aspect ratio	5.33
Area	350 sq. ft.
Wing section	R A F 3
Gap	5′ 9″
Stagger	5½″
Angle of incidence	1½-3°
Declage	1½°
Dihedral	1½°
Sweepstack	3°
Weight light	1,430
Weight loaded	2,150
Load per sq. ft	6.2
Load per H.P	12.1
H.P. 150 or 180 Hispano-Suiza.	
Fuel capacity	50 gal. or 5 hours
Climb, loaded	5,000 ft. in 10 min.
Speed Max. 107 M.P.H. Cruising 94 M.P.H.	



LINCOLN STANDARD SPEEDSTER

THE STRUCTURAL ANALYSIS AND DESIGN OF THE AEROPLANE

By B. C. BOULTON

In Charge of Stress Analysis and Structural Design, McCook Field

(Continued from page 712)

II. Strength of Materials.

THIS subject is the division of mechanics which deals with the internal stresses in the members of a structure, and the manner in which the members resist the external forces acting upon them. The foundation for this entire section of mechanics is the "beam theory," which will be briefly developed. The purpose of the beam theory is to enable the stress at any point, in any cross section of a rigid body subjected to bending, to be calculated. The simplest case will be considered first. Let the beam in Fig. 12 be acted upon by a set of forces as shown. The forces and the beam have the following conditions imposed upon them:

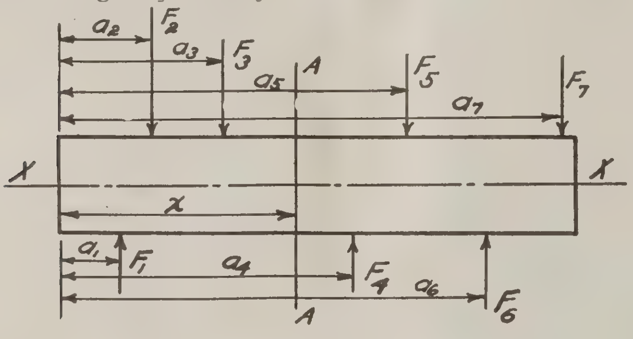
(1) All the forces are parallel and lie in a single, vertical plane passing through the axis of the beam and dividing each cross section symmetrically.

(2) The forces are perpendicular to the axis of the beam.

(3) The material of the beam is homogeneous.

(4) The beam is of uniform cross-section throughout.

(5) The axis of the beam is a straight line containing the center of gravity of every cross section.



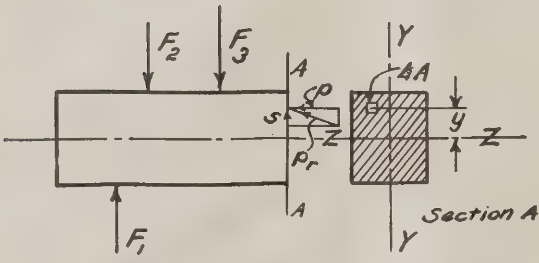


Figure 12. Beam with external loads
Figure 13. Beam to left of Section A-A

(The term cross section denotes a plane section perpendicular to the axis of the beam.)

In a beam conforming to these conditions in shape, material and loading take a section A-A (Fig. 12) and isolate that portion of the beam to the left of the section (Fig. 13). Since the beam is in a condition of equilibrium the internal forces acting upon the section must be such that the equations of equilibrium, $\Sigma H = 0$, $\Sigma V = 0$, and $\Sigma M = 0$, are satisfied. Since there are no external forces acting upon the beam in the direction of the ZZ axis, there can be no component of the internal stress along this axis. That ΣV may equal zero, a vertical component of the internal stress must exist so that $F_1 - F_2 - F_3 + S^{2}0$, where S is the internal shear at the section. In the same manner the internal resisting moment of the components of the internal stress normal to the section must be such that $F_1 (x - a_1) - F_2 (x - a_2) - F_3 (x - a_3) + M = 0$, where M is the internal resisting moment at the section. Furthermore, as none of the external forces have any horizontal component along the beam axis, the algebraic sum of these normal components of the internal stress must equal zero. They therefore form a couple.

Consider any small element of area in the cross section ΔA and let P_r be the resultant internal stress acting upon it. P_r may be resolved into two components—s, a shearing stress, and p, a normal stress. Then $\Sigma \Delta A \cdot s = \Sigma F$, and $\Sigma \Delta A \cdot p \cdot y = M = \Sigma F(x - a)$, and $\Sigma \Delta A \cdot p = 0$, Σ denoting "the sum of".

There are three fundamental assumptions in the common theory of beams:

(1) A cross section which is a plane before bending remains a plane after bending.

(2) "Hooke's Law" holds; that is, the stress is proportional to the strain throughout the beam.

(3) The ratio between the normal component of the stress at any point in a given cross section to the strain in the direction parallel to the axis of the beam at that point is the same for both tension and compression, and has the same value that would be obtained from a bar of like material subjected to a uniform tension or compression. In other words, the moduli of elasticity in tension and compression are equal.

To make these assumptions perfectly clear the words "stress" and "strain", as used in this connection, will be defined. Stress is the force of tension or compression acting upon a *unit* of area, and is expressed as pounds per square inch. Strain is the elongation or deformation per *unit* of length, or the total deformation divided by the length within which that deformation occurs. It is expressed in inches per inch. Hooke's Law merely states that until the unit stress reaches a certain value, known as the elastic limit of the material, the ratio between the stress and the strain is a constant quantity, called the modulus of elasticity, which is expressed in pounds per square inch.

Consider now a portion of a bent beam (Fig. 14) and take two plane cross sections AB and CD, which before bending were a distance L apart. If assumption 1 holds some longitudinal layer, mn will, after bending, have a length L_1, and the length of all other layers parallel to mn will be proportional to their distance from a fixed center. If the distance mn is taken short enough, the intersection of the neutral layer mn with the plane of the forces can be considered as an arc of a circle of radius r. The length L_1 can be found from the proportion $\frac{L_1}{L} = \frac{r + y}{r}$. Let α equal the strain in the layer m_1n_1, and then $L_1 = L + \alpha \cdot L$. From this, $\frac{L + \alpha \cdot L}{L} = \frac{r + y}{r}$, or $\alpha = \frac{y}{r}$. Hence the strains in the various layers of the beam are proportional to their distances from the neutral layer. The intersection of the neutral layer with the plane of the forces is known as the neutral axis of the beam.

It follows from assumptions 2 and 3 that the intensity of the

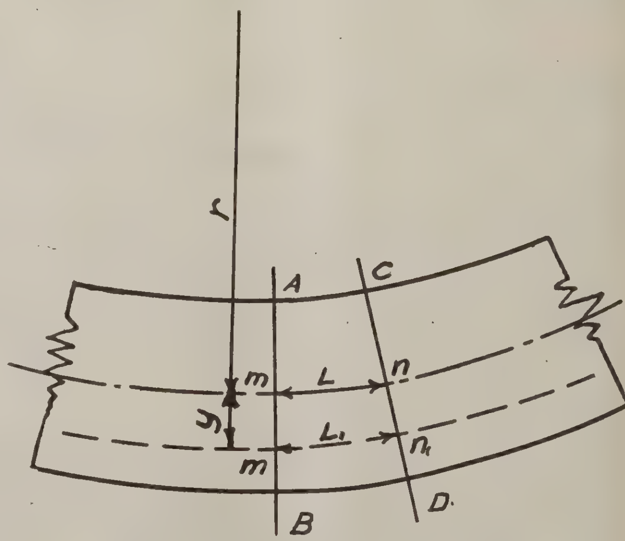


Figure 14. Illustration of beam curvature

normal component of the stress on any cross-section is zero at the neutral axis, and at any other point in the section is proportional to the distance of that point from the neutral axis. That is, the stress varies uniformly, and since the resultant is a couple the neutral axis must pass through the center of gravity of the section. This variation in normal stress over the cross-section may be represented graphically, as in Fig. 19.

If A equals the intensity of the normal stress at a unit's distance from the neutral axis, then the intensity of stress at a distance y equals $p = ay$. Substituting this value for p in the expression for M, $\Sigma \Delta A \cdot p \cdot y$, previously given, we have $M = \Sigma \Delta A \cdot a \cdot y^2 = a \cdot \Sigma \Delta A y^2$. Since I, the moment of inertia of the section, equals $\Sigma \Delta A y^2$, $M = aI, = \frac{p \cdot I}{y}$. From this $p = \frac{My}{I}$, where p is the normal stress at any point at a distance y from the neutral axis, and M is the external bending moment at the section. P is called the "fibre stress". When y equals the distance from the neutral axis to the outside layer of the beam, at the section of greatest external bending moment p is a maximum, and is called the "maximum fibre stress".

A thorough knowledge and understanding of the conditions and assumptions given above are essential to an intelligent application of the principles of the strength of materials.

The problem which follows illustrates nearly all the points connected with the calculation of moments and shears, and the plotting of moment and shear curves. As the work is given in detail no further explanation is necessary. The usual graphical representation of bending moment and shear given in Fig. 18 will be found of help in determining the sign.

The convention used in statics of calling clockwise moments plus and the reverse minuus, no longer alway holds The standard, almost universally adopted, is that moments which produce compression in the top of a beam are positive and moments which produce tension in the top of a beam are negative. Shear is positive when the left half of the beam tends to slide up past the left. These conventions of course apply not only to the total moment or shear at any point but to the moment or shear caused by any individual load.

The complete computations for the reactions, shears, and bending moments for a beam loaded as shown in Fig. 15 are as follows:

Calculation of Reactions

$$\Sigma M_F = -\frac{125^2 \times 1}{2} - 5 \times 70 \times 90 - 100 \times 125 - 50 \times 80 -$$

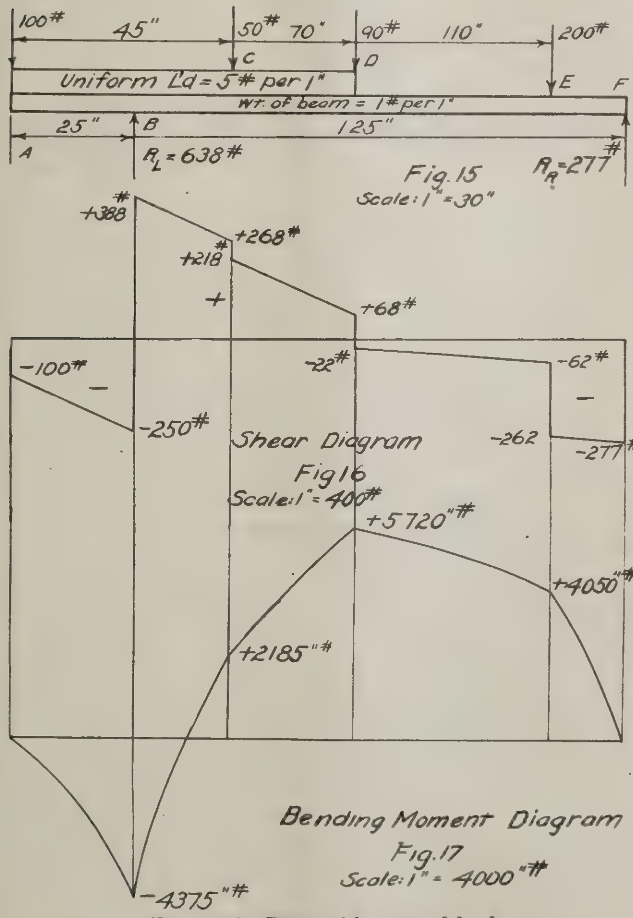


Figure 15. Beam with external loads

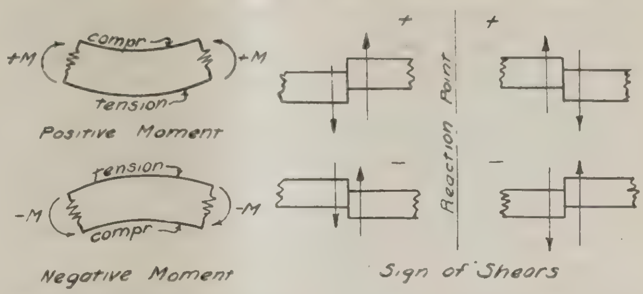


Figure 18. Graphical representation of sign for moments and shears

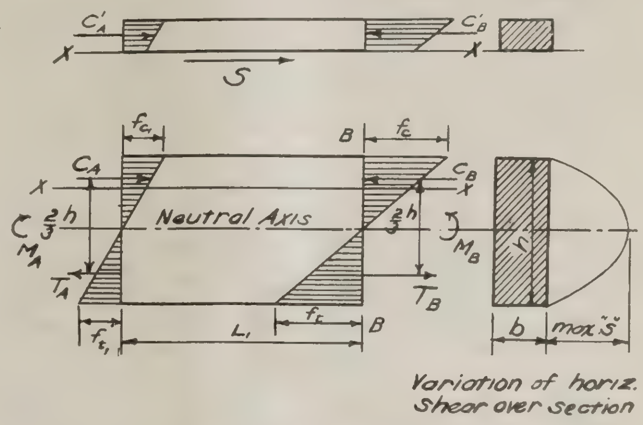


Figure 19. Portion of a beam showing internal stresses

$$90 \times 55 - 200 \times 15 + R_L \times 100 = 0.$$

$R_L = +638$ lbs. = left reaction.

$\Sigma V = 638 - 100 - 50 - 90 - 200 - 5 \times 70 - 1 \times 125 + R_R = 0.$

$\Sigma M_B = -100 \times 25 + 5 \times 70 \times 10 + 50 \times 20 + 90 \times 45 + 200$

$R_R = +277$ lbs. = right reaction.

$\times 85 + 125 \times 1 \times 37.5 - R_R \times 100 = 0.$

$R_R = +277$ lbs. = right reaction.

Calculation of Shears

Shear at $-{}^*A = 0.$

Shear at $+{}^*A = -100.$

Shear at $-B = -100 - 6 \times 25 = -250.$

Shear at $+B = -250 + 638 = +388.$

Shear at $-C = +388 - 20 \times 6 = +268.$

Shear at $+C = +268 - 50 = +218.$

Shear at $-D = +218 - 6 \times 25 = +68.$

Shear at $+D = +68 - 90 = -22.$

Shear at $-E = -22 - 40 \times 1 = -62.$

Shear at $+E = -62 - 200 = -262.$

Shear at $-F = -262 - 15 \times 1 = -277.$

Shear at $+F = -277 + 277 = 0.$

*+ designates the right side of section, — the left side.

Calculation of Bending Moments

Moment at A = 0.

Moment at $B = -100 \times 25 - \frac{6 \times 25^2}{2} = -4375$ in. lbs.

Moment at $C = -100 \times 45 - \frac{6 \times 45^2}{2} + 638 \times 20 = +2185$ in. lbs.

Moment at $D = -200 \times 40 + 277 \times 55 - \frac{55^2 \times 1}{2} = +5720$ in. lbs.

Moment at $E = +277 \times 15 - \frac{15^2 \times 1}{2} = +4050$ in. lbs.

Moment at F = 0.

In constructing moment and shear diagrams it is convenient to remember that, with concentrated loads only, the shear is constant between loads and the moment varies as a straight line; with uniform distribution of loads, the shear varies as a straight line and the moment as parabola; with uniformly varying, distributed loads, the shear curve is a parabola, while the moment curve is a cubic parabola. In all cases, for downward loads, the moment curve is convex upward for both a negative cantilever moment and the moment within the span. One very common mistake made both in plotting bending moments, and in using them in beam design, is to fail to convert moments, expressed in foot-pounds, into inch-pounds when the other units in the problem require this conversion.

Several extremely important relations exist between the bending moment and shear in a beam. The bending moment at any point, or the ordinate to the moment diagram, is equal to the algebraic sum of the areas under the shear curve to that point, multiplied by the scales to which the shear curve is constructed. For example: referring to Fig. 17, the cantilever moment at B $= M_B = -\frac{(.25'' + .625'')}{2} \times .833'' \times 30 \times 400 = -.364$ sq. in. $\times 12{,}000 = -4375$ in. lbs.; or the moment at C $= M_C = [-.364 + \frac{(.97 + .67)}{2} \times .667] \times 12{,}000 = +2185$ in. lbs. As a corallary of this relation we have the fact that the maximum bending moment occurs at the point where the shear curve changes sign; that is, where the external shear is zero. (See Figs. 16 and 17.) Very often the only moment desired is the maximum one, and since the shear curve shows at once the one or two points where this moment can occur, the moment at these points can be computed without the necessity of drawing the moment curve. One more relation exists between the moment and shear that is much used. By it, it is possible to compute the moment at any section in a beam, knowing the moment at any other section, the shear at that section, and the loads between the two sections. The equation is: $M_x = M_b + S_b \cdot x + \Sigma F \cdot a$, $\Sigma F \cdot a$ being the moment about section X of all the loads between the sections. Whether the plus or minus sign is used with the second and third terms depends on the direction of the shear and the loads. If these are in such a direction as to cause a positive bending moment, or one that would produce compression in the top of the beam, their sign is positive, otherwise it is negative. In this connection, a positive shear can always be considered as an upward load, and a negative shear as a downward load.

Example: $M_D = -4375$ in. lb. $+ 388$ lbs. $\times 45$ in. $- \frac{6 \times 45^2}{2} - 50$ lbs. $\times 25$ in. $= \times 5720$ in. lbs. (See Figs. 15-17.) The necessity of very clearly understanding, and thoroughly knowing these last three propositions must be strongly emphasized.

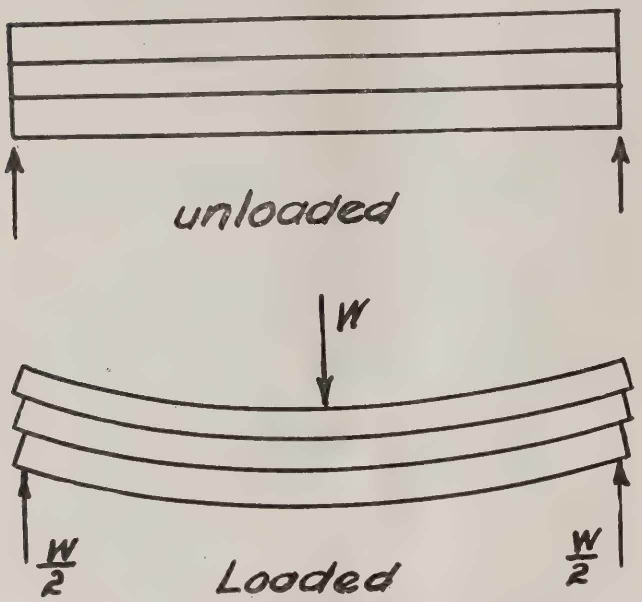


Figure 20. Illustration of effect of horizontal shear

In the explanation of the theory of beam action the question of stresses due to shear was not touched on. It was shown that the external shear at any section equals the algebraic sum of the forces on either side of the section. According to the last principle presented in the preceding paragraph there can be no increase in an external bending moment unless an external shear is present at the section over which this increase in moment occurs. Furthermore, in order that the internal resisting moment may increase, as the external moment becomes greater, certain stresses are set up between the horizontal layers of a beam which are called "horizontal shear" stresses. Referring to Fig. 19, it is evident that, if the bending moment at section B-B is larger than that at section A-A, there will be a greater intensity of normal stress at all points on section B-B. If a portion of the beam above any horizontal plane X-X be isolated, it will be seen that the condition of equilibrium for horizontal forces requires a horizontal shear S acting on the underside of the section equal to the difference between the normal forces on the ends. Letting b denote the breadth of the beam, and L, the distance between sections A-A and B-B, the intensity of horizontal shear on the X-X plane $= s = \frac{S}{b \cdot L_1}$. As shown in Fig. 19, the intensity of this shear stress has a parabolic variation from zero at the outside layer to a maximum at the neutral axis of the beam. Its value is given by the formula, $s = \frac{S \cdot Q}{b \cdot I}$ in which S is the external shear at the section, Q the statical moment about the neutral axis of the portion of the beam above the horizontal plane (usually the one through the neutral axis) on which s is desired, and I the moment of inertia of the entire cross-section.

Fig. 20 is a graphical representation of what takes place when instead of a single beam, three separate planks are used. Because no resistance is offered to horizontal shear forces acting between the planks, they cannot act as a unit, and the combination has but one-third the strength of a single beam of the same total depth and width.

Beams must always be investigated for their strength in horizontal shear, for failure will occur just as readily from this cause as from excess in normal stress, if the beams are improperly designed. The example which follows makes the application of the shear formula clear.

Calculation of Horizontal Shear Stresses in a Beam

Assume a beam of the section shown in Fig. 21.

Moment of inertia $= I = \frac{2 \times (3.6)^3}{12} - \frac{(20 - .6) \times (2.4)^3}{12} = 6.17$. (Fig. 21.)

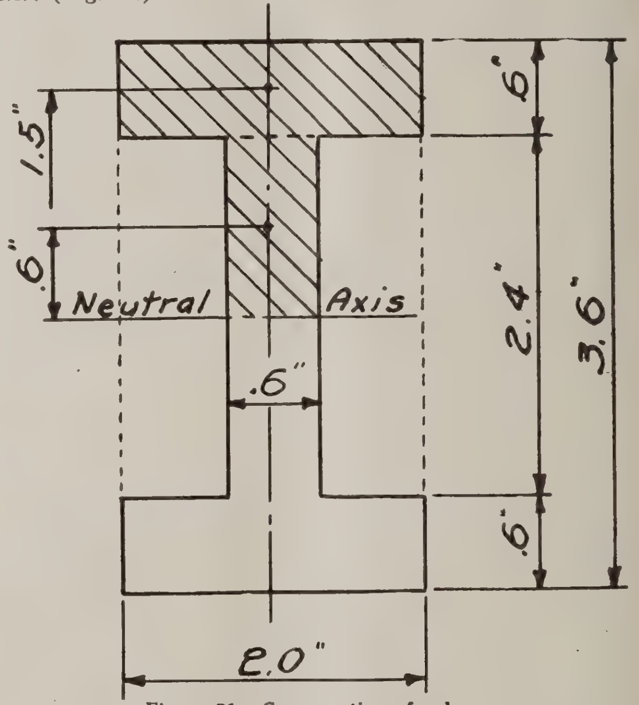


Figure 21. Cross-section of a beam

Maximum statical moment $= Q = 2.0 \times .6 \times 1.5 + .6 \times 1.2 \times .6 = 2.24$.

The width of the beam on the section of greatest shearing stress = D = .6 in.

External shear on section = 1,000 lbs.

Maximum intensity of horizontal shear = s.

$$s = \frac{1{,}000 \times 2.24}{6 \times 6.17} = 605 \text{ lbs. per sq. in.}$$

In addition to horizontal shear stresses, stresses due to vertical shear are present. These stresses act in planes at right angles to the horizontal shear stresses, and at any point are equal to the latter, in accordance with the principle that shear stresses on any two planes at right angles to each other are equal in intensity. As a rule, vertical shear stresses are not a limiting factor in design work.

(*To be continued*)

(*Continued from page* 735)

the finances, they had requested information from time to time, but could not obtain it.

In view of Mr. Edwards' notice it became imperative to take legal action, otherwise failure to take legal action would be considered as acquiescence to the plan stated in Mr. Edwards' letter and, therefore, every member of the Board of Governors of the Club would thereafter become liable for the deficits incurred in the operation of the Club House of the American Flying Club, which, as already stated, involved a deficit of over $50,000 during the past year.

There were other objections besides the financial objections and Mr. Woodhouse, Major Glidden and other members tried hard to bring the evidence in the case before the Board of Governors, but on every occasion they were prevented from doing so by either one or all three of the defendants in this action. Therefore, it became necessary to appeal to the Supreme Court of the State of New York to protect the rights and interests of the Governors and members of the Club.

Evidence That Actions of Defendants Are Illegal

Aside from the actual evidence of conspiracy to wreck the Club by schemes engineered by the few individual employees and members of the Manufacturers Aircraft Association whose methods have been condemned by the U. S. Senate Investigating Committee as "vicious and designed to reap large profits by taking advantage of the necessities of the Government," and are being investigated by the U. S. Attorney General, the affidavits presented gave evidence that the three defendants are acting without authority and in violation of the Constitution and By-Laws of the Aero Club of America. On this point the affidavits read as follows:

The affidavits presented to Judge Glennon gives the following evidence proving conclusively that defendants are acting unlawfully in their attempts to obtain control of the Club:

The plain, unvarnished facts show that the defendant, Charles L. Poor, was appointed Chairman of the so-called "Co-operating Committee" and which Committee was authorized by a resolution proposed by the defendant James A. Blair, Jr., at the meeting of April 7th, 1920, and which resolution reads as follows:

> "That the President appoint a Committee of five to study the situation, draw up plans and submit their recommendations to the Board of Governors of the Club to bring into closer co-operation with the Aero Club of America all the aeronautic interests of America. This Committee to report to the Board of Governors within five weeks."

The aforesaid resolution is the sole source of authority from which defendants can claim the right to proceed as they have. The minutes of the meeting of the Board of Governors of the Aero Club of America held on June 29th, 1920, show the following resolutions to have been duly moved, seconded and carried, to wit:

"Mr. Wise Wood movd the following resolution:

> **"That it is the sense of the Governors that no action respecting the consolidation or absorption of the Aero Club of America by the Flying Club, or the Flying Club by the Aero Club be taken at and by a meeting of the Executive Commttee; but that the question be left solely in the hands of the Board of Governors.**
>
> **"Mr. Woodhouse and Mr. Cabot seconded the following additions in the form of an Amendment:**
>
> **"And that the Club will not be committed in any way by any of its officials on the subject of consolidation until the matter has been finally decided by the Board.**
>
> **"Mr. Blair moved the following addition:**
>
> **"That no action be taken by either the Executive Committee or the Board of Governors until the report of the 'Poor Committee' has been finally submitted with recommendations to the Board.**
>
> **"The above resolutions, duly seconded, were carried unanimously."**

That the subsequent meetings, held on July 7th, 1920, and July 14th, 1920, were Executive Meetings only, a quorum of the Board of Governors not being present, and therefore only routine business could be considered. That deponent was present at each of the aforesaid meetings and knows whereof he speaks and the minutes will so disclose. Furthermore that the subject of consolidation could not and did not come before such Executive Meetings for consideration.

Nevertheless the very next day following the Executive Meeting, held on July 14th, 1920, as aforesaid, deponent received a notice of the proposed meeting of the Board of Governors of the Aero Club, signed by the defendant, Charles Jerome Edwards, as "Acting President," and which notice is annexed to the complaint and marked Exhibit A, and which notice reads in part as follows:

> "A meeting of the Board of Governors of the Aero Club of America will be held on Wednesday, July 21st, at one o'clock, in room No. 6 of the Bankers Club, 120 Broadway, New York City. You are earnestly requested to be present.
>
> "Among important matters to be considered at this meeting the Committee on Co-operation will present its report, regarding the steps necessary to carry out the amalgamation of the American Flying Club with the Aero Club of America. The plan as heretofore approved by the respective Boards of Governors of the two Clubs, contains the following general provisions:
>
> "1. Members in good standing of the Flying Club shall be eligible to membership in the Aero Club, without election * * *
>
> "2. Amendments to the Constitution and By-Laws of the Aero Club are to be made to prevent the commercialization of the Club * * *
>
> **"3. A complete new Board of Governors of the Aero Club is to be elected. The membership of this Board is to be determined by a Committee of six, three from each Club**
>
> **"4. The Aero Club is to assume the lease of the present Club House of the Flying Club, and to make that House the Club House of the enlarged Aero Club. In taking over this house, the Aero Club is to repay, over a term of years, the amount ($20,924.10) which has heretofore been expended upon the house in making it available for Club purposes."**

These defendants, having for the time being secured control of the Board of Governors, and being clothed only with the authority granted by resolution heretofore quoted and *without the authorization of the Board of Governors to justify their illegal acts,* propose:

1. To consider steps necessary to carry out the amalgamation of the American Flying Club with the Aero Club of America;

2. Take in *all* members of the Flying Club in good standing with such Club, without election of any kind—in direct violation of the Constitution and By-Laws of the Aero Club of America and without questioning or considering the character, associations or desirability of such proposed members;

3. Amend the Constitution and By-Laws of the Aero Club —and in a manner most drastic and far reaching as hereinafter shown;

4. Abolish in toto the complete Board of Governors of the Aero Club of America and wihch Board was duly elected at the Annual Meeting of said Club, with due notice to its members, and posting of tickets in accordance with the By-Laws, and the election of a new Board of Governors *NOT BY THE MEMBERS* but to be appointed by a "Committee" "of six, three from each Club," and it goes without saying the members thereof from the Aero Club of America would be these three individual defendants, selected by themselves, and, last but not least;

5. The assumption of the lease of the present Club House of the Flying Club by the Aero Club of America, and a like assumption by the said Aero Club of America of an indebtedness of $20,924.10—the amount "which has heretofore been expended upon the house in making it available for Club purposes."

In this connection deponent is gratified to note that immediately following the bringing of this suit and the service of the summons and complaint and motion papers herein, on July 20th, 1920, that these defendants found that the *could* eliminate the assumption of the item of indebtedness of $20,924.10 and which would practically absorb all the available assets of the Aero Club of America and that these defendants state at Fol. 53 of their said joint affidavit sworn to July 27th, 1920:

> "the additional obligation of $20,924.10 mentioned in Exhibit 'A' annexed to the complaint * * * has now been eliminated" and thereby argue "we deny that the Manufacturers Aircraft Association will by reason of any contemplated action instituted by said Committee have financial control of the Aero Club of America."

Therefore it is obvious that one result of the present action instituted by the plaintiff has been the saving of the present assets of the Aero Club of America to the extent of $20,924.10.

That notwithstanding the resolutions duly moved, seconded and carried at the full meeting of the Board of Governors, held June 29th, 1920, and at which meeting eight or more members thereof and sufficient to make a quorum under the said By-Laws were present. And that the next meeting of the Board of Governors at which a quorum of eight members was held took place on July 21st, 1920—the two intervening meetings being only Executive Meetings—as less than eight members of said Board were present and the By-Laws providing that such meeting attended by three or more and less than eight members shall entitle such Board to sit as an Executive Committee only, and the fact that the steps proposed to be taken concerning the proposed amalgamation, as herein set forth, were drastic and vitally affected the members of said Aero Club of America and members of the Board who were absent, involving the taking into the Club of the entire membership of another Club without election; amendments to the Constitution and By-Laws of the Aero Club; abolition of the present and existing Board of Governors and the assumption of unknown obligations under a lease and of an indebtedness of $20,924.10, which would practically wipe out the entire assets of the Aero Club of America, nevertheless these three defendants, as the minutes, if correctly reported, of such meetings will disclose, absolutely and arbitrarily on every occasion refused to furnish any details of the liabilities to be assumed, to consider the feasibility of such proposed plan or to permit any discussion or debate to take place in reference thereto, and that at all such meetings one of these three individual defendants occupied the chair, and always ruled any and all attempts on the part of Major Glidden or deponent or such other individual so disposed to consider the details thereof, and likewise refused to permit or allow the facts connected with such proposed plan to be forwarded to the various members of the Board of Governors of the Club who were absent, and members of the Club, or to allow any such resume of the facts connected with said proposed plan to be formulated, discussed or considered by members so that such members, and absent Governors of said Club, might be in a position to consider the matter intelligently and with full knowledge of the relevant facts and prior to any meeting of such members called for the purpose of passing upon the merits thereof.

Even at this time it will be observed that all facts concerning the financial obligations to be assumed, the extent, nature, etc., thereof, and other vital facts, figures and details are carefully eliminated from the printed statements which these defendants claim are being sent out to various members with certain proxies as annexed to affidavit of Augustus Post, sworn to July 29th, 1920, and used in opposition hereto.

Deponent further states that the various excerpts submitted by these defendants from the minutes of the meetings of the Board of Governors of said Aero Club of America and Executive Committee meetings thereof are incomplete, incorrect, and otherwise misleading. Deponent instances that in the alleged memorandum of action taken at the meeting of the Board of Governors of Aero Club held on July 21st, 1920, it is reported, as set forth and attached to the opposition affidavits herein and commented upon at length by these defendants, to wit:

> "Mr. Glidden: May I record my reason for voting in the negative? The Chairman: Yes, sir. Mr. Glidden: First, I am opposed to the section which throws out the Governors. I think that is all. Mr. Miller: That is your only objection? Mr. Glidden: As to the lease I do not feel quite clear on that. But it is up to the new Board of Governors to manage the Club."

That at such meeting deponent was present and that the aforesaid alleged report of said conversation is incorrect in that Major Glidden was asked if he would still object if all the financial liabilities were removed and only such members of the Flying Club were admitted to membership in the Aero Club who passed its present tests and requirements. And that at such time Major Glidden said, in such event, his remaining objection would be the proposed By-Law which abolished the present Board of Governors.

That with respect to alleged cablegrams received from Europe, deponent states that same were addressed to the defendant personally at No. 120 Broadway, New York City, which is not the address of the Aero Club of America—that all official cables of said Club are sent to and from said Club at the Club House address; that therefore such cables are responsive to personal ones forwarded by the defendant Charles Jerome Edwards, the contents of which are unknown, and deponent believes, and therefore alleges, that the said Edwards in such personal cables misrepresented the situation.

As briefly indicating the attitude of these defendants, deponent quotes from the minutes of the meeting of the Board of Governors of the Aero Club of America, held June 2, 1920, to wit:

> "Mr. Woodhouse then proposed that a copy of Professor Poor's report be sent to each and every member of the Board with a complete statement showing the financial liabilities and obligations, if any, to be assumed, and that each member of the Board be asked to express his views regarding each proposition contained in Professor Poor's plan.
>
> "It was stated that this was unnecessary at this time as the purpose of the resolution was only to recommend a broad policy which would then be submitted ot the members of the Board in detail."

Again from the minutes of the meeting of said Board of Governors, held July 21, 1920:

> **"Mr. Woodhouse: It has been stated by the speaker that the Board of Governors of the Club approved and authorized a number of things, which the minutes read of the full meeting of the Board and which you moved to adopt, state that they did not have authority to do. In view of the importance of this matter I request that my letter dated July 20, 1920, herewith handed to the President, be read, as it contains remarks bearing on the subject.**
>
> **"The Chairman: The question is whether you want to bring up at this time any extraneous matter. If so the Chair will gladly read the letter to the Board.**
>
> **"Mr. Woodhouse: This letter requests that certain information be sent to the Board and to the members of the Club.**
>
> **"The Chairman: Inasmuch as that was discussed on April 27th, 1920, and the Board at that time voted not to send out said information, it seems to me this is entirely out of order."**

Financial Assets of Aero Club and Liabilities of Flying Club Revealed

The Aero Club of America has occupied its present quarters, corner of Madison Avenue and 41st Street, Borough of Manhattan, New York City, for the past nine years under instruments of lease, containing exactly the same provision with respect to cancellation as set forth in the new proposed lease thereof. Furthermore, the Board of Governors has been assured that in view of the fact that the adjoining house on Madison Avenue is owned by the owner of the large "Doctor's Building" located on said 41st Street and in the immediate rear of building occupied by said Aero Club of America, and that as the plot on such corner is too small to erect a tall office or other building, the said Aero Club can continue to benefit from this condition for a considerable period of time. On the other hand the property and Club Houses of the said American Flying Club consists of three small houses, two located on 38th Street and one on 39th Street, and which were not constructed for the purpose of being operated as one and are mechanically and otherwise inefficient and require at least twice the number of domestic help and personnel and cost twice as much to operate as would be the case if a single house were available as in the present Club House of the said Aero Club of America. This is demonstrated by the fact that it costs over $4,000 per month for salaries and keep of employees alone or approximately $48,000 per year to operate the present Club House of said American Flying Club, as against a total of exactly $10,918 per year to operate the present Club House and quarters of the Aero Club of America, for like items of wages of employees, salaries of office force, etc., thereby costing, in round figures, approximately $38,000 per year *less* in wages and salaries, etc., alone to operate present Club House of the Aero Club of America. Again the cost for rental, taxes, heat, light, water, repairs, laundry, etc., for the current year to operate the said Club House of the American Flying Club has totalled upwards of $50,000, as against a total of less than $10,000, or to be exact, $9,595.00, for all similar items, to wit: rent, repairs, light, heat, laundry, miscellaneous, etc., in connection with the operation of the Club House of the Aero Club of America, or about $40,000 *less* than similar expenses of the American Flying Club.

As appears by the report made by the Secretary of the Aero Club of America to its Board of Governors at their meetings held on June 22nd and June 29th, 1920, and which report is submitted herewith, it will only have cost the Aero Club of America for year ending October, 1920, for all its official activities, national and international in scope, and in the accomplishment of the numerous things that it did, the sum of $8,460.

It is therefore apparent that the operation and management of the said American Flying Club for the past year, including wages, salaries, rent, heat, etc., etc., amounts to considerably over $100,000.00 as against a maximum total of $29,000 for the Aero Club of America for year ending October, 1920, as appears by budget submitted by its Secretary as aforesaid, to wit.

(*Continued on page* 751)

NAVAL and MILITARY AERONAUTICS

N. Y.-Alaska Planes Leave Edmonton

Edmonton, Alberta.—The three United States Army aeroplanes, blazing an aerial trail from Mineola, N. Y., to Nome, Alaska, have left Edmonton for Jasper.

The fliers once started on this 200 mile lap but were forced back by a storm after completing seventy miles.

Army Participation in the Gordon-Bennett Cup Race

The officers designated by the War Department to represent the Army in the Gordon-Bennett International Cup Race, which will be held in France the week of September 27th, will sail from Hoboken, New Jersey, on August 20th. Captain Walter G. Kilner of the Army Air Service will be in charge of the expedition. Captain Rudolph W. Schroeder, who is particularly well known to the public because of his wonderful altitude flights, will pilot the American army plane in this race. The substitute pilot for Captain Schroeder will be Captain Corliss C. Moseley of the Army Air Service, and First Lieutenant Alfred I. Puryer of the Army Air Service will be the Supply Officer. This race, which will be a three hundred kilometer event, or approximately one hundred and eighty-six miles, will probably start at Villa Coublay, just outside of Paris. The turning points will be one hundred kilometers apart.

This being an international event and three entries permitted from each nation, the army fliers will spare no effort to bring the trophy to the United States. The machine which they will fly will be a Verville, named after its designer, and is an army product, having been developed at McCook Field, Ohio. This new army plane has been particularly designed for pursuit purposes in war times, and its showing in the International Cup Race will be watched with great interest. The other entrants from the United States, it is understood, will be the Curtiss Company and the Dayton-Wright Company.

It is not definitely known just what nations will be represented, but it is understood that the entries have already been received from England, France, Italy and Sweden. The army plane is an after-war development, not a racing plane, but the army air men believe that they have an excellent chance of being the first to cross the finish line.

Marine Chart Corrected From Aeroplane

The Aviation Section, U. S. Marine Corps, reports a new use of the aeroplane as an aid to navigation. The captain of a U. S. Navy vessel in Dominican waters, desiring to enter the harbor of Barahona, found himself without reliable charts or a pilot. Arrangements were made with a Marine Corps aviator to fly over the harbor with the captain as a passenger. In this way the latter was able to correct his chart for reefs, sand bars and channels and bring his ship safely into the port.

Cadet Flyers on Forest Patrol Work at March Field

Aerial forest patrol from March Field, California, is now almost entirely in the hands of cadets graduated from the cadet school at this field in May. Lieutenants Herold and Ott are the only two remaining commissioned pilots detailed to this work. Cadets Rouse, Eckerson, James, London, Calkins and Dolph comprise the remaining pilots in the flight. Sergeant 1st Class Clyde Taylor is in charge of the hangar and DH-4-B aeroplanes used exclusively in this work.

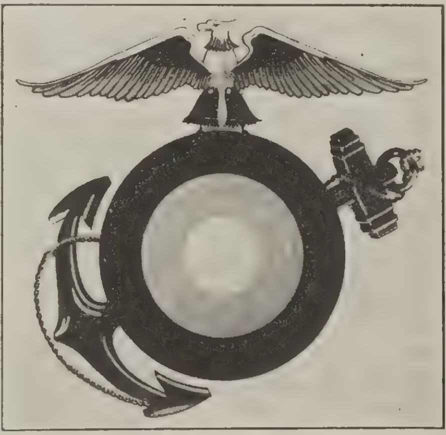
Two patrols are maintained daily. One to the south over the Cleveland National Reserve as far south as San Diego and the other to the north and west over the Los Angeles Reserve as far as Santa Barbara. Wireless communication between planes in flight and this station is maintained at all times. Lieut. Joseph Morris is in charge of the radio equipment. Forester C. R. Benton is detailed to this post by the Forestry Department in connection with the work.

It is significant that on one flight recently over the Cleveland Reserve five different fires were reported within 30 minutes' time. Flying at about 12,000 feet altitude the range of vision is very great and the different fires covered a vast area. These were spotted by radio on the maps in the field office, however, and telephonic communication established immediately with the various rangers in the mountains. The fires were all extinguished before a great amount of damage had been done.

Helium Production by the Government

Fort Worth, Tex.—It is authoritatively stated that the Government will proceed with its original plans for the construction here of a helium production plant to cost approximately $5,000,000. The experimental plants for obtaining helium from the natural gas of the Petrolla field have been in successful operation at Fort Worth and Petrolla for more than two years.

Several months ago a Congressional committee made an adverse report on the construction of the proposed plant here on the ground that the cost of extracting helium was too heavy to make it a feasible enterprise. This report seems to have been of no effect, as contracts have just been let for enlargements of the initial plant here. The Reagan Construction Company of Baltimore, Md., has been awarded the contract for a gas storage house to be built of sheet steel, a water settling basin and a water supply system. The natural gas pipe line from Petrolla to Fort Worth, which was constructed by the Government, is practically finished. The contract has just been awarded for the construction of concrete gig boxes for the pipe line. It is expected that the big plant here will be finished and placed in full operation about Oct. 1. The helium gas will be for the use of the army and navy, Lieut. Commander R. G. Walling, U. S. N., has been detailed in charge of the plant.



New Insignia for U. S. Marine Corps Aviation

The United States Marine Corps Aviation Service has a new insignia which will hereafter appear on all Marine Corps aeroplanes. It is an attractive design, and the circles are colored as follows: Outside, red; next circle, blue, and the inner one white.

Standard Designations for Personnel

For the purpose of supplying the office of the Chief of Air Service with exact knowledge of the particular professional or technical qualifications of officers and enlisted men, additional standard designations have been adopted as follows: For officers—gas, airship, pilots, balloon pilots, maneuvering, meteorological, hangar, navigating, transportation, photographic, flying instructors, officer instructors. For enlisted men—coxswain (airship), engineer (airship), maneuvering sergeant, rope maker, telegraph operator, bookkeeper, balloon gasman, balloon winchman, fireman (stationary), parachute repairman, storekeeper, typist, toolmaker, tire repairman and vulcanizer. An officer or enlisted man on duty at an Air Service activity to whom one of these designations is applicable will have the designation written on his trade report, so that headquarters will always have on file for use in any particular activity the personnel records of the officers and men available in such instance.

Hospitals Open to Army Reserve Aviators

Officers of the Officers' Reserve Corps, in an inactive status, who voluntarily participate in aerial flights conducted under the rules and regulations prescribed by the Chief of Air Service when injured or taken sick are to be admitted to Army hospitals. When so admitted they will be on the same status as civilians. This ruling by the War Department is to amend Army Regulations and substitute No. 1459¼ in the revised issue now being compiled.

Six Aeroplanes Lost in Fire

Belleville, Ill.—Fire of undetermined origin at Colt field, the government aviation station five miles east of Belleville, recently, destroyed a hangar, six aeroplanes and several Liberty motors. The damage is estimated at $100,000.

FOREIGN NEWS

Long-Distance Flights from Paris

With the object of flying to Rome and back within 24 hours, Maneyrol left Villacoublay on a Morane-Saulnier machine recently. Starting at 4.6 a.m., he reached Turin at 7.56 a.m., and was at Rome at 10.15 a.m. He set out on the return journey at 1.25 p.m., but encountered severe weather, and after struggling on to Turin, had to give up the idea of getting back to Paris that day.

Fronval, who started from Villacoublay at the same time to fly to Madrid and back, made the outward journey under difficulties, being impeded by clouds and mist, but landed safely at the Getase aerodrome, outside the Spanish capital. On the return journey, however, a storm caused him to land at Burgos, and he was unable to reach Paris before midday the next day.

Germany Resuscitates Aerial Mail

The German aeroplane postal service, after a period of suspension, is to be given a new lease of life. It was announced that a start was to be made on July 4. The first service to be between Berlin and Swinemunde.

A Bayonne-Bilbao Service

An aerial service was started recently between Bayonne and Bilbao. The passengers on the first seaplane to make the trip to Bilbao were M. Flandin, the French under-Secretary of State for Aeronautics, Commandant Casse and M. Jacob.

London-Paris Rates to be Reduced

One result of the reasonable rates which are being charged for the carriage of mails by air to Holland and Belgium is that early and substantial reduction of the fees for the Paris service is in contemplation. This is good news to those who believe in aerial mails.

London-Brussels Postal Service

It is understood that the contract for the conveyance of the Royal Mails by air service between London and Brussels has been given to Handley Page Transport, Ltd. The postal rates have not yet been definitely fixed, but it is stated that they will be less than those for the service to Holland.

Peru and Commercial Aviation

Commercial aviation is not yet practised in Peru. There are at present in the country six two-seater Curtis biplanes of the training type with dual control. There are also two machines imported by the French Military Aviation Mission, and more English flying boats are expected to arrive shortly. The Government is open to proposals for a service of mail and freight carriage, in virtue of a Bill passed by the Legislature empowering it to make such a contract. It appears useless to offer machines only, the Government apparently desiring to enter into a comprehensive contract under which it would be free from all responsibility as regards the working of the service. There would seem to be a considerable field for the employment of aeroplanes along the barren coast of this country, where distances between the principal settlements are great and the sea voyage occupies considerable time. The prevailing winds are from the South, and flying may very possibly be interfered with by fog during four months of the year. Flying in the interior does not present good prospects on account of the different mountain ranges and the frequency of bad pockets and variable currents. The possibility of the carriage of valuable ores in the interior is being considered, but for the above reasons and the lack of good landing-places the prospects for it are not very favourable.

Aerial Mails in France

It is announced from Paris that a new air service for passengers, mails, and merchandise commenced operations on July 1 between Paris, Dijon, and Bourg.

The League of Nations and the Air

It is announced that the following air representatives on the Permanent Armaments Commission of the League of Nations have been appointed: Great Britain, Group Capt. P. R. C. Groves; France, Brig.-Gen. Dumesnil; Japan (temp.), Maj.-Gen. H. Watanabe; Belgium, Col. A. E. M. Van Crombrugghe; Greece, Capt. Panas.

No Cockardes on Civil Aircraft in France

The French authorities have issued a warning to civil Aviation concerns that the tricolour cockard must not be carried on commercial aircraft. Any machine so marked must have such markings removed by August 1.

Flees by Aeroplane to Elude Scotland Yard

London.—John de Lysle, a stock promoter, wanted by former army officers who put money in some of his enterprises that failed to give returns, has escaped to France by aeroplane.

When his creditors, ten days ago, started proceedings against him, de Lysle pleaded for a little time. Sunday night at dusk he induced Lieutenant Bradley to carry him to Paris in an aeroplane and there he disappeared. Scotland Yard has given up its vigil at seaports.

Bristol Aeroplane Co. Buys the Cosmos Engineering Co.

The designs, materials, and special plant of the Comos aero engines, which gave such excellent promise, have been purchased by the Bristol Aeroplane Co., Ltd., Filton, Bristol, and A. H. R.. Fedden is starting up for this firm an equipment for aero engine development and manufacture.

Paris-Brussels and Paris-Geneva

A new service has been started—and will soon be a daily one—from Paris to Geneva, and the restarting of the Paris-Brussels service which has been suspended for some months also took place. The Geneva machine started from Le Bourget, the pilot being Durafour, while the machine for Brussels—a Farman Goliath, was piloted by Tor.

To Assist French Manufacturers in China

French aeroplane constructors in China are to be assisted by the French Government through the intermediary of the Société Nationale Aeronautique, who will sell them material now in China which was originally intended for Russia.

Establish Permanent Aero Services in India

Advices from Calcutta report that the Indian Government is prepared to consider contracts of fifteen years' duration with private firms for the establishment of effective aerial mail transport services for India, Burma and Ceylon. Aerodromes are to be erected for the purpose, the main stablishment connected with the Royal Air Force being situated at Bangalore.

As an initial step in the encouragement of Indian aviation, the British Government has recently presented to the Indian Administration one hundred aeroplanes, of which four are destined for Burma. A certain number are to be placed in the care of the Indian princes for special employment in their own territories. A native School of Instruction is being established, and the prediction has already been made that a complete Indian aerial service will be in existence before the end of 1921.

At the present time Calcutta is the aviation centre for India and is likely to remain so, owing to its geographical position. A company has already been registered there with a capital of 15,000,000 rupees under the title of Handley Page Indo-Burmese Transport, Ltd., for the purpose of undertaking comparatively short passenger and freight services pending the establishment of permanent long-distance services to suit the commercial needs of the country. An aeroplane works, a school of instruction and an hotel form part of the objects of the company.

An Aerial Picnic

For their annual outing last Saturday the employees of Messrs. Macdonald, Syer and Co., Ltd., engineers, of England, commenced what may become a new vogue. Two aeroplanes—a Handley Page, with thirteen passengers on board, and a De H 4—conveyed a number of the party to Margate. On the homeward journey there was such a demand for seats that a ballot had to be arranged.

The Monument to Chavez

M. Flandin, the French Air Minister, has given his patronage to the committee in charge of the memorial to Chavez, who was killed at the conclusion of his flight over the Alps on September 23, 1910. The memorial is to be unveiled at Brigue, where the disaster occurred, on September 12, and the Peruvian Government has contributed 10,000 francs towards the cost.

Lieut. Roget's Progress

Another stage in his aerial tour of Europe was made by Lieut. Roget when he flew from Lemberg to Bucharest. He had to negotiate several thunderstorms and took 5 hours to cover 281 miles. He reached Constantinople on July 4.

Medieval Battle Gage Sent Via Aeroplane

Constantinople.—A medieval challenge to battle has been sent by Mustapha Kemal Pasha, leader of the Turkish nationalists, to the commander of the Greek army that is advancing through Anatolia, according to a telegram from Smyrna.

A modern touch was given to the challenge, however, when the nationalist chieftain sent it by aeroplane. He proposed that the Turkish and Greek armies engage in conflict in the region of Afium-Karahissar, 175 miles south of Constantinople, to determine the victor.

Swiss Customs Station for Aircraft

It is hereby notified that:—

The mooring place for seaplanes and flying boats at Geneva is at the Eaux-Vives, which is on the eastern shore of the Lake of Geneva, and opposite the entrance to the park "La Grange." All such aircraft arriving from or leaving for foreign countries must report to the Customs official at the above-mentioned mooring place; arrival at or departure from any other place on the Lake of Geneva is strictly prohibited, and this prohibition is also applicable to arrivals from or departures for the interior of Switzerland. The Customs Office Geneve-Lac (Rue de la Scie 7), or the Customs Post Geneve-Lac (Rue de Lac 5), should be advised of any pending arrival from or departure for a foreign country.

The above regulations are applicable only to seaplanes and flying boats which descend in the Geneva Consular District; further regulations will be promulgated concerning other Consular districts in Switzerland.

The R80 Ready for Launching

The Vickers rigid airship, R80, which was practically completed by the end of last year is due for launching. It is an all-British ship, except that the engines, although built in England, are Maybachs. It represents a distinct advance in design and construction, and the result is seen in speed, which is superior to that of the R34, although it is a smaller ship.

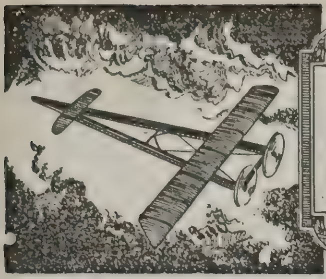
It comprises numerous detail improvements, and is a triumph of duralumin work. The hull is of true streamline form, as also are the cars. There is a gangway from end to end, and a way up to the gun platform on top.

The R80 and the R34 are here compared:—

	R80	R34
Gas	1,250,000 c. ft.	2,000,000 c. ft
Length	530 ft.	645 ft.
Max. Diameter	70 ft.	78½ ft.
Gross Lift	38½ tons	59 tons
Disposable Lift	17½ tons	30 tons
Power	960 h.p.	1,250 h.p.
Engines	4 Maybachs	5 Sunbeams
Speed Max	65 m.p.h.	62 m.p.h.
Speed, Cruising	50 m.p.h.	45 m.p.h.

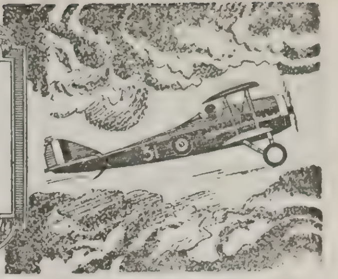
The R80 is expected to give a performance in speed and endurance superior to that of R33 and R34. The total gross lift is approximately 38.5 tons under normal atmospheric conditions, when the airship is at sea-level. The disposable lift—that is, the amount available for carrying fuel and oil, water, ballast, crew, and passengers, and other useful loads—is 17.5 tons. It will travel at full speed for a distance of 4,000 miles, or at a cruising speed of 50 miles per hour for about 6,500 miles.

The hull has 21 sides, and the total gas capacity is divided up into 15 separate gas bags. The half-structure is made entirely of duralumin. The gas bags are made of single-ply cotton fabric, rubber-proofed.



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon



CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB
921 Ravenna Boulevard, Seattle, Wash.
BAY RIDGE MODEL CLUB
8730 Ridge Boulevard, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE CLUB
Bloomington, Indiana
BROADWAY MODEL AERO CLUB
931 North Broadway, Baltimore, Md.
TRIANGLE MODEL AERO CLUB
Baltimore, Md.

NEBRASKA MODEL AERO CLUB
Lincoln, Nebraska
BUFFALO AERO SCIENCE CLUB
c/o Christian Weyand, 48 Dodge St., Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicago, Ill.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bldg., Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB
455 Murray Ave., Milwaukee, Wis.

CONCORD MODEL AERO CLUB
c/o Edward P. Warner, Concord, Mass.
MODEL AERO CLUB OF OXFORD
Oxford, Pa.
CAPITOL MODEL AERO CLUB
1726 M Street, N. W. Washington, D. C.
AERO SCIENCE CLUB OF AMERICA
Beach Bldg., E. 23rd St., N. Y. City
AERO CLUB OF LANE TECHNICAL HIGH SCHOOL
Sedgwick & Division Streets, Chicago, Ill.

The Construction and Design of Aviettes

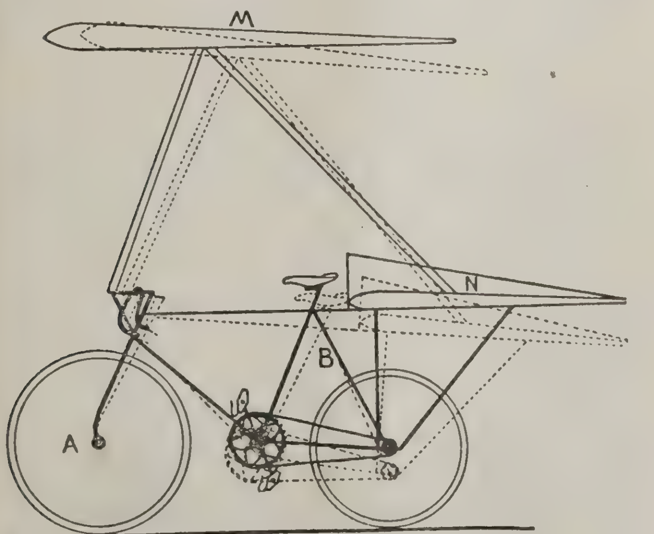
(Continued)

Resistance of Struts

The resistance of struts varies according to the shape, and from the table accompanying this article the reader can determine the weight and resistance per 100 feet of strut. (This weight is for spruce struts.)

No.	Resistance in lbs. for 100 ft. of strut 1 in. wide at 60 M.P.H.	Weight per 100 ft. of strut if made of spruce.
1	104.4	41.6
2	81.9	16.4
3	59.2	30.4
4	36.9	34.8
5	63.0	33.4
6	28.6	37.7
7	54.9	30.0
8	12.8	39.7
9	12.8	41.0
10	13.5	39.7
11	13.5	38.0
12	29.9	36.4
13	45.9	36.6
14	14.2	51.9
15	13.5	47.0
16	18.7	44.1
17	15.1	71.0
18	16.4	67.2
19	13.5	62.0
20	13.5	66.1
21	24.6	42.5

The reader would naturally select the strut that shows the least resistance and weight. This will be found to be strut No. 8. Again, the reader may wish to use one single strut in place of two, in that case he would use a strut somewhat like No. 9, which has less weight than if two No. 8 struts were used, but the resistance is higher on account of the added skin friction.



Drawing of the Poulain aviette showing the method employed to rise from the ground

To figure the total resistance of struts we simply find the number of feet of strut used on the machine. For instance, we will say that the gap between the planes is 5 feet, and we will use eight interplane struts on the outer section of the wings and four 2½ feet struts over the body, then we have (8 × 5) plus (4 × 2½), or 50 feet of strut. Upon consulting the table we find for the No. 8 strut 12.8 pounds per 100 feet of strut; then for 50 feet the resistance would be one-half this amount, or 6.4, at 60 M.P.H. The weight, if made of spruce, would be one-half 39.7 pounds, or 19.85 pounds for the 50 feet.

Another type of aviette, which recently was tried out in France

Wires, Cables and Fittings

The resistance of wires, cables and fittings can only be approximated, and for the lack of any better method would be quite safe for us to consider the resistance of these parts as 10 per cent of the total resistance. Stranded wire or cable has about 20 per cent greater resistance than smooth wires. If, when double wiring is used, a fairing strip of streamline form is placed between the wires, the resistance is reduced considerable. Again, inclined wires or cables offer less resistance than vertical. For instance, the wires on a staggered plane control wires running fore and aft, etc.

Summing the whole thing up, the main thing to remember is to keep resistance down as much as possible and to get the maximum efficiency out of the lifting surfaces.

By keeping the wings far apart so that there is no interference, or by staggering them so the top wing is a trifle in advance of the bottom, would help to get near 100 per cent efficiency, which is cut to 80 per cent where the interference is great.

Perhaps a few words regarding the design of an "aviette" would help.

To begin with, I would suggest a bicycle of extremely light weight. There was a time when they made some with aluminum frames; if one of these could be obtained, all the better to keep down weight.

(To be continued next week)

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

A Useful Education

By Berton Braley

They gave me army tactics,
They filled me full of Math,
They taught me how to build a trench
And march along a path;
I had a course in rifle fire
(Which wasn't used in air);
They drilled me on the bayonet
Till I had skill to spare.

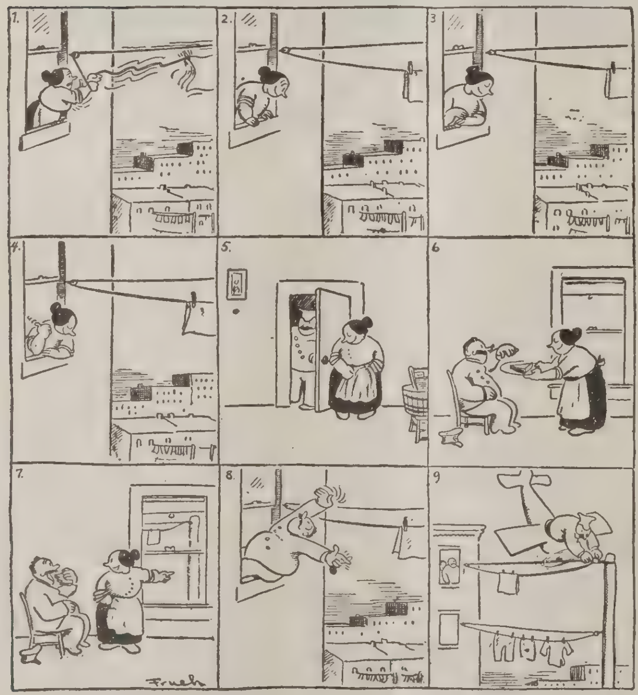
I learned to take a plane apart
And set it up again,
I studied motor theory
For weeks and weeks, and then,
When I looked forward hopefully,
To zooming through the sky,
They said I musn't flip because
I hadn't learned to fly.

So it was cool at Kelly Field
And Mineola, too,
And when they shipped me "over there,"
And hope sprang up anew
But what I caught was school once more:
They forced me to endure
A three months' course at Issoudun,
Which followed one at Tours.

They grounded me completely for
The soaring pilot's trade,
And kept me grounded all the while
The mighty game was played;
Yet what I learned of motor lore
Upon the solid loam
Will fit me for a first-class job
In some garage at home!

—*North Island Naval Air Current.*

MAYOR HYLAN'S SKY COPS.



Courtesy N. Y. World

The Bonus Blues

Speaking of that proposed bonus bill reminds us of a little ditty we once heard:

The bonus bill is going through,
Parlez vous,
The bonus bill is going through,
Parlez vous,
The bonus bill is going through
In Nineteen hundred and ninety-two,
Hinkey, dinkey, parlez vous.

Talk About the Helicopter; This Is a Record

News note:

Claims Record for Traveling Straight Up and Down

Washington.—After thirty-two years of service operating the elevator at the Washington Monument, James B. Evans claims to hold the world's record for elevator traveling.

Free Contest

We have heard who wins the brown derby, but what we want to know is who gets the Aerial Derby. The aeronautician who guesses this will be awarded the corrugated iron billiard table.

Decadent Days

Ancient Version—Wine, Woman and Song.
Modern Version—Ginger Ale, Suffrage and Victrolas.

They Missed His Trade

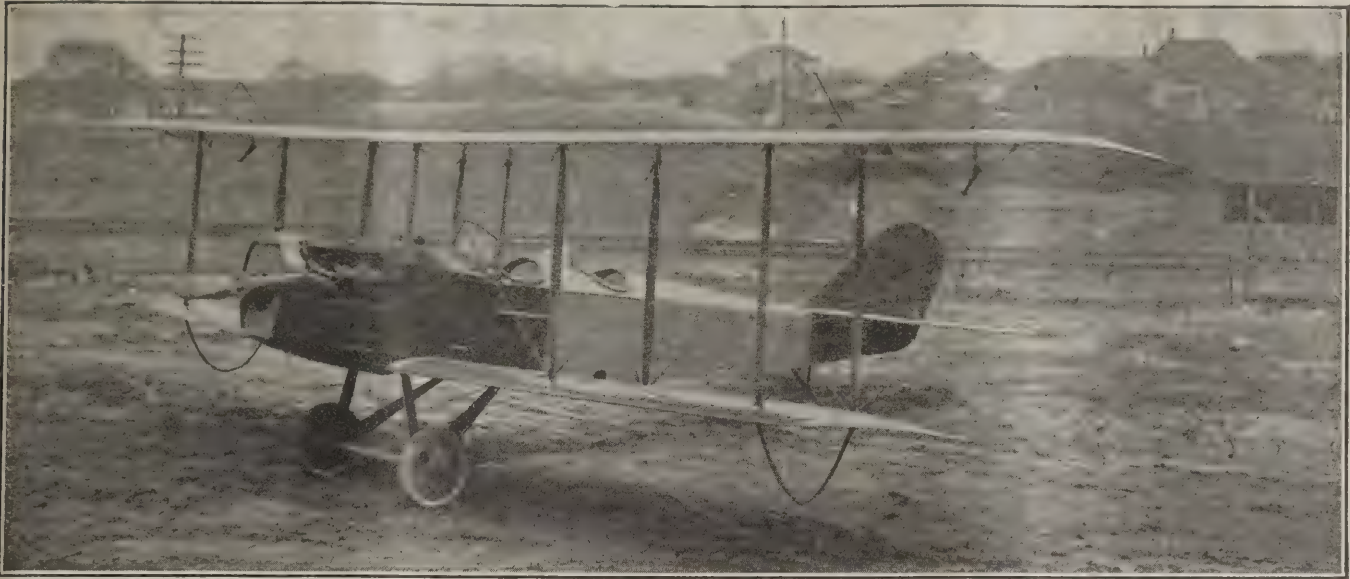
Fresh from overseas, with one gold chevron on his sleeve, Pvt. Octavius Caesar Augustus Johnsing, of the Stevedores, made a gallant figure on the street. He was noticed to stop and look longingly at every store that gave evidence of formerly having been devoted to the distribution of thirst-quenching goods.

Finally a policeman accosted him and asked: "In trouble, my man? Anything I can do for you?"

"Mistah Ossifer," replied Johnsing, "Ah jest wants ter put mah haid on yo' shouldah an' sob mah ha't out!"

"What's the trouble? What makes you feel so bad?" sympathized the cop.

"Well, Ah's gwine to tell yer," answered Private Octavius. "Here Ah is," tapping his gold chevron with a long black finger, "jest back from Europe after lickin' dem Hums an' makin' de world safe fo' de Democrats, jest as Ah 'greed, an' whut yo' s'pose? Jest as soon as Ah lef' dis 'yere country an' took mah patronage 'way fum de saloons dey jest nachully went out o' bus'ness!"—*Stars and Stripes.*



Immediate Delivery on the Three Seater **Lincoln Standard Tourabout**

150 H. P. HISPANO-SUIZA MOTOR

Slow Landing Speed
Quick Take Off Fast Climb
Remarkable Durability

Built for business and pleasure. A demonstration convinces the prospective purchaser.

Land at Lincoln for Oil, Gas and Supplies.

NEBRASKA AIRCRAFT CORPORATION
Factory and Supply Depot **Lincoln, Nebraska**

DISTRIBUTORS

Walter T. Varney, 832 Post St., San Francisco, for Northern California, Arizona, and Nevada.
J. M. Wild, 377 W. 41st Place, Los Angeles, for Southern California.

Martin-Sweet Motor Company, Denver, for Colorado and Utah.
Harry Hiles, Cheyenne, Wyo., for Southern Wyoming.

Northwest Aircraft Corporation, Newell, S. D., for Western South Dakota.
Erick Aviation Company, Erick, Okla., for Western Oklahoma and Pan Handle.

"Expenses of Aero Club of America for year ending October, 1920:

House

Wages	$5,468,00
Rent	6,000.00
Repairs	995.00
Light	850.00
Heat	600.00
Laundry	650.00
Miscellaneous	500.00
Total	$15,063.00

Office

Salaries	$5,450.00
Stationery	1,400.00
Flying	2,400.00
Telegraph and Telephone	850.00
Travel and Entertainment	1,500.00
Postage	550.00
F. A. I. Dues	260.00
Medals and Engraving	1,000.00
Miscellaneous	500.00
Total	$13,910.00

"Income of Aero Club of America for year ending October, 1920:

Dues	$16,000.00
License	1,300.00
Entrance Fees	2,700.00
Rooms	3,700.00
Investments	1,300.00
Total	$25,000.00
"Cash in Bank	$2,633.75

"Securities on hand at cost:

$5,100 Liberty Bonds (3½%)	$5,100.00
2,000 Tell Col.	2,000.00
2,000 Tel. & Tel. 4's	1,845.00
2,000 Western Union (4½%)	1,942.50
2,000 L. S. & M. S. 4's	1,918.75
2,000 Armour (4½%)	1,900.00
	$14,706.25
"Securities held in trust, Liberty 4½%	$6,250.00

It will be noted from the foregoing report that the total income from all sources of said Aero Club of America for the year ending October, 1920, amounts to $25,000. That it has $2,633.75 cash on hand to meet current expenses, the further sum of $14,706.25 invested in high class securities and equivalent to cash and the further sum of $6,250.00 likewise invested, designated as held in trust and set apart for prizes.

Defendants claim that said American Flying Club has a membership of approximately 750, and assuming that all became members of the Aero Club of America and paid the dues of $30.00 each, amount stated, which would total $22,500 income per year, and further assume, accepting defendant's figures for the purpose, that an additional income of $1,040 per month could be obtained from the bedrooms of the Club House of American Flying Club, or $12,480, from said source, the present yearly income from the Aero Club of America from all sources and including the item of $3,700.00 for rental of bedrooms, amounted to but $25,000. It therefore follows that a total net income, at the very most, which the Aero Club of America could under any circumstances expect if such plans were adopted would be approximately $57,000 per year, which the cold facts and figures disclose would mean a loss yearly of approximately $50,000. It is a well known fact that restaurants operated in connection with Clubs always involve large deficits, and said Flying Club suffered large deficits from its restaurant, and therefore no income could reasonably be anticipated from such quarter.

For the Club to maintain its independence this could only be met by additional assessments against the members and it is a well known fact that assessments of that kind invariably cause a large number of resignations.

It is submitted that all these things are facts and stern realities and not "figments of the imagination" as defendants would have us believe, and under such circumstances it requires very little imaginative qualities of mind for the ordinary business man to determine just how long said Aero Club could be expected to continue clear of financial difficulties; or the length of time before the said Manufacturers Aircraft Association would find it an easy prey to its influences and designs and commercial and wholly selfish and mercenary purposes.

(To be continued)

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

(*Continued from page* 714)

Disque's Unexplained Change of Routes

The Lake Crescent 36-mile route connected with the Milwaukee road at Joyce and then took a southerly course through two tunnels, deep cuts of 150 feet depth through solid rock, and over the Olympic Mountains, striking spruce 30 miles distant, near the east edge of the Lake Pleasant spruce-timber tract. The Deep Creek route, previously determined upon by Col. Disque, would have struck spruce within 5 miles from Deep Creek and would have reached Lake Pleasant spruce tract by an extension of 25 miles. The Lake Crescent route, by expensive construction, however, shortened the direct line from Port Angeles to Grays Harbor a few miles. It also took over Muellers Pass, the only available pass over the mountains not owned by the Milwaukee, and prevented threatened competition by the Port Angeles & Grays Harbor Railway or any other competitor. It gave absolute control of future freight hauls, if taken over by the Milwaukee road, of 20,000,000,000 feet of timber for many years to come, including 2,000,000,000 feet belonging to that company. Col. Disque decided on the Lake Crescent route. Mal. Sawyer, a superintendent of the Milwaukee road, was placed in absolute charge, as stated, and a Milwaukee engineer conducted the surveying for the new road, while Senator Donlan, of Missoula, Mont., took charge of proposed logging operations.

Director Ryan's trip of 6,000 miles across the continent and back in July and August looking over Carey's railroad and the Carey mill construction work has been mentioned. He left for Europe without visiting the $1,553,000 Yaquina road, or the 23-mile $2,000,000 Blodgett road, or any other important spruce-production work. He did not question Carey's spruce mills or railway operations when he made his inspection trip.

At the time the armistic was signed Carey's 36-mile road lacked 14 miles, or 40 per cent of its length, of track laying and ballasting. This Mr. Carey completed, at Government expense, on orders of Gen. Disque, who was advised to do so by Erling and Sawyer of the Milwaukee road.

Supt. Sawyer returned to the Milwaukee road after the war ended. Mr. Carey returned to New York and Col. Disque also left Portland and went to New York City, where he was made president of the Amsinck Importing Co., through the influence of John D. Ryan, at $30,000 a year, in charge of a business of which he knew absolutely nothing. As previously stated, all of the stock of the Amsinck Co. and 51 per cent of the Siems-Carey Canal Co. were owned by the American International Co., of New York, of which Mr. Ryan was a director.

A Trivial Proposed Two-Million-Dollar Gift

Throughout the proceedings it was urged that notwithstanding a cost-plus profit of upward of $3,000,000 was assured Carey under his $23,000,000 contract if completed, with a minimum profit of $1,400,000, Carey's motive in making the contract was to continue the lumbering business after the war. Mr. Ryan, in his letter, says he knew this to be so when the contract was redrawn for Carey (p. 100). Mr. Donovan, a millman and Col. Disque's close adviser, opposed Carey's new mill (p. 955). Mr. Mark Reed, a logger, and another Disque adviser, did the same (p. 1174). All practical lumbering men were of the same opinion. Milling facilities on Puget Sound, according to the testimony of several witnesses, reached about 40 mills with a sawing capacity of 6,000,000 feet daily on an eight-hour shift, or 12,000,000 feet daily on two shifts. This was eight times the largest production proposed in Carey's contract and yet, after evidence that Carey intended to haul logs 80 miles and raft them from Sequim Bay to private mills, the important fact appears that Carey's mill at Port Angeles was built with full knowledge and approval of Director Ryan, who inspected Carey's operations in July. The mill cost $2,395,345.14 (p. 2859). This was paid for by the Government and built apparently to help Carey's lumbering interests after the war.

The Siems-Carey Corporation received over $8,000,000 from the Government without ever producing a single foot of spruce flitches. In fact, Mr. Carey testified that six weeks before the close of the war, in September, 1918, he began to "retard things" (p. 2741). It required no effort for him to do what was chronic with all of Col. Disque's cost-plus operations, none of which ever produced. The serious part of it all is that while the country was sacrificing and making every effort to win the war $19,000,000 were thrown away on these spruce cost-plus contracts by men representing the Government who had no experience, for the benefit of other men who equally had no experience. The Howes telegram in November, 1918, with Gund's telegram and the Ray report, apparently frightened those who were expecting to "amortize" the Government property, according to Mr. Ryan's letter to Secretary Baker (p. 100), and men who were to finance these operations afterward dropped out, and the junk remains as a reminder of how money was wasted.

Senator Donlan's $15,000,000 Scheme

Specific evidence on this point is found in the testimony of Senator Donlan, formerly interested with Mr. Ryan in business. He testified:

> I said to Carey, . . . I have raised a pack pot of seven and a half millions in cash and they will underwrite to put in seven and a half million more . . . I got a wire (from Carey) on the 29th day of January (1919). A letter the next day gave me his reasons—that this investigation—there were charges made which were along the line that was made last summer. . . .
>
> Mr. FREAR. The time of which you speak was six months or more before a congressional investigation had been considered?
>
> Mr. DONLAN. Yes; but there were some charges filed, Mr. Chairman, by somebody at Grays Harbor (p. 3221).

Senator Donlan's scheme fell through, although it was Carey's plan to "amortize" the Government properties, when he made his spruce contract in which Donlan had a one-sixth interest.

Senator Donlan formerly had charge of Anaconda Mining Co.'s logging operations (p. 2102). In 1916 the Anaconda Mining Co. reported timber holdings valued at $5,500,000. Based on the value of the Blodgett timber purchased by Col. Disque, this amount would indicate that holdings by the Anaconda Co. would produce several billion feet of lumber, or double the holdings of the Milwaukee road in Clallam County.

No discussion is offered regarding many significant matters, including the cold-blooded elimination of Cain, Aston, Lindsay and others connected with the Port Angeles & Grays Harbor line by freezing them out of their railway properties and proposed spruce contracts, and the quick exit of Pliny Fisk and his New York associates, who were suddenly dropped out, while Carey, Siems and Kerbaugh received guaranteed cost-plus contracts aggregating $27,000,000 or, including the mill contract, nearly $30,,000,000—all awarded to New York City railway contractors who knew nothing about logging or lumbering, who owned no timber, but intended to continue in the lumbering business after the war with a railroad and mills built at Government expense in the manner stated.

Official Responsibility for Failures

Your committee has been commissioned neither to exaggerate conditions nor to cover them up, but to get the facts. This we have tried to do without conscious prejudice, political or personal. In describing conditions during times of war that invited condemnation of acts of officials charged with responsibility, justice must be done the public that has been injured, but injustice should not be visited on those whose conduct has invited criticism. We have been in the spruce forests of Washington and Oregon; we have observed the methods of operation there in the attempt to produce spruce lumber; we have inspected the railroads, mills and other governmental property there; we have seen and heard testify many of the officials in charge of such operations, and we have tried to give an impartial and correct picture of the situation that existed there under the military régime of Col. Disque.

The record of Col. Deeds, who was directly responsible for aircraft production until relieved about January 1, 1918, has been set forth in the Hughes report (pp. 3706-3806). In the judgment of your committee, during his connection with American aircraft his acts are deserving the severest condemnation. His efforts to place large valuable governmental contracts with his business associates in Dayton; his own questionable connection with the purchase and location of the aviation fields; his evidence of self-interest are fully disclosed in the Hughes hearings.

(*To be continued*)

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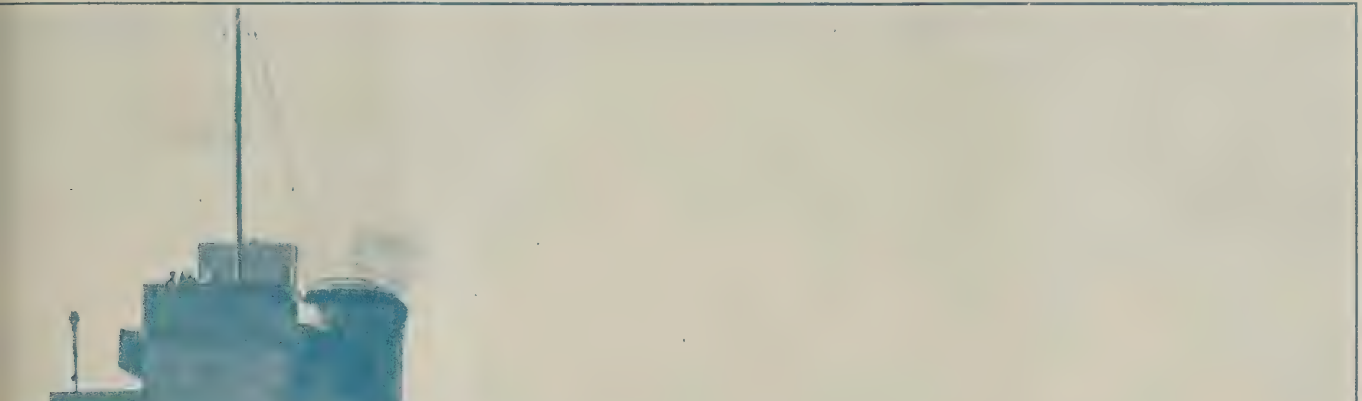

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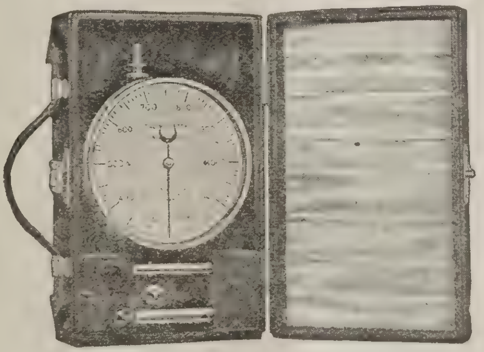

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VOL. XI AUGUST 16, 1920 NO. 23

TABLE OF CONTENTS

PAGE

Purposes of Irregular Meeting of A. C. A. Called for August 16, Violate New York State Laws....... 765

The News of the Week............ 768

Attorney-General Requests Memorandum Setting Forth Names of Witnesses in Conspiracy Charges. 768

The Aircraft Trade Review....... 770

The Gallaudet C-3 Liberty Tourist Plane 771

Duralumin 772

A New High-Lift Wing.......... 774

The Structural Analysis and Design of the Aeroplane............... 775

Book Reviews.................. 777

Report of Latest Congressional Investigation of Billion Dollar Aircraft Expenditures............ 778

Naval and Military Aeronautics... 779

Foreign News.................. 780

Elementary Aeronautics and Model Notes 781

Aeronitis 782

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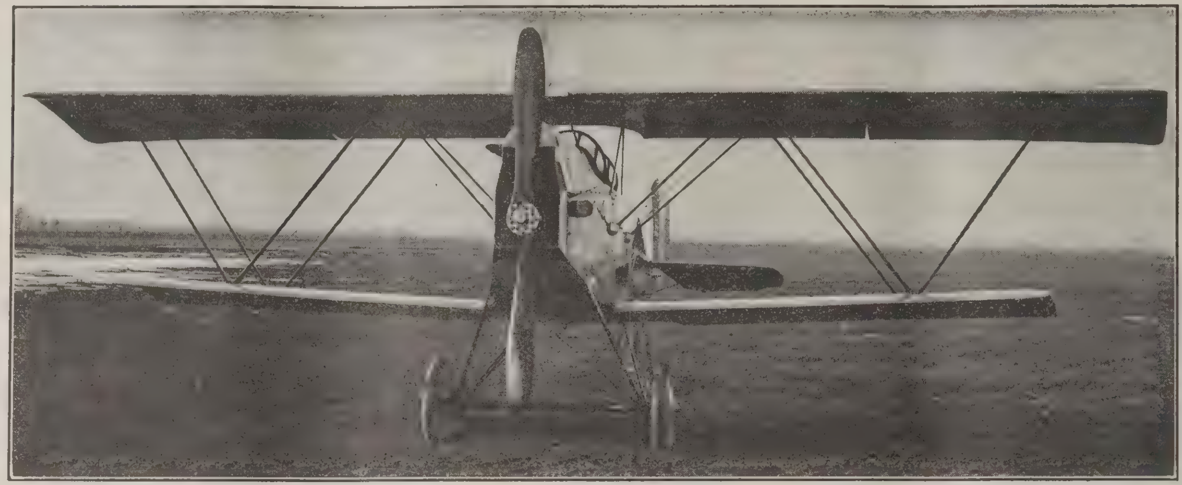

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VOL. XI. NEW YORK, AUGUST 16, 1920 No. 23

PURPOSES OF IRREGULAR MEETING OF A. C. A. CALLED FOR AUGUST 16, VIOLATE NEW YORK STATE LAWS

Committee to Protect Legal Rights of Club Members Calls Special Meeting for August 28th, to Postpone Assuming Flying Club Obligations and Other Doubtful Actions Until Members of Aero Club Have Been Given Opportunity to Study Situation

FINDING that the purposes of the "special" and irregular meeting of the Aero Club of America, called for August 16th, by a small group of members violate a number of the Membership Corporation Laws of the State of New York, the Committee which was found to protect the legal and financial rights of the members of the Club has protested against this irregular and unlawful meeting and against making those members who may have signed proxies in good faith, without knowledge of the facts, parties to this bold attempt to take control of the Aero Club and its treasury surplus and make the Aero Club assume the ruinous obligations of the Flying Club.

This Committee has called a special meeting to be held on August 28th, the purposes of which are stated in the following notice sent to the members of the Club:

BY signing and returning the enclosed proxy stating whether you are in favor of postponing until the Annual Meeting, on November 8th, 1920, action on the proposed changes of By-Laws which violate the Membership Corporation Law of the State of New York, and plans for assuming financial obligations far in excess of the Club's financial resources, which it is proposed to adopt at a hasty meeting called for August 16th by some members, you will assist in solving the present difficult problems facing the Aero Club of America.

Postponing action on these proposed changes of By-Laws, until the regular Annual Meeting on November 8th will permit submitting the matter to the entire membership for vote and will bring to an end the legal actions instituted in the Supreme Court of New York by a member of the Board of Governors on behalf of Governors and members and himself, for the purpose of safeguarding the interests of the Club and its Governors and members to bring the facts about the issues involved to the attention of the entire membership of the Club. It will solve all the problems because further actions will then be by the entire membership of the Club, and in accordance with the Membership Corporation Law of the State of New York.

As this proxy supersedes and revokes the proxies which members may have signed for the irregular meeting of August 16th without knowing that thereby they would become parties to an attempt to violate specific provisions of the Membership Corporation Law of the State of New York, you will be protected by this proxy from any attempt which the individuals who hold the other proxies, may make to use said proxies at future times by adjournment or other methods.

The financial and moral responsibilities that would be assumed in connection with the proposed changes of By-Laws and taking over of operation of the Flying Club, which would involve a deficit of over $50,000 a year, are too great, and the moral issues involved are too vital to the Club, and cannot, under the Membership Corporation Laws of the State of New York, be assumed; and should not be assumed, as it is proposed by some members, at the hastily called and irregular meeting to be held August 16th. Nor can the term of the present Governors be ended before the end of their term under the Membership Corporation Law of New York State, as the Law specifically states that in case of changes of By-Laws as regards directors, each director then in office shall serve until his term expires.

The only fair, equitable and legal way of disposing of this matter is to follow the provisions of the Membership Corporation Law of the State of New York, and submit to the members the proposed changes of the Constitution and By-Laws of the Club with the old Constitution and By-Laws, together with an explanation of the benefits which it is expected the Club will derive from the changes, and a financial plan showing how the new obligations are to be financed, and the justification, if any, for the proposed increase in membership dues, and other similar radical changes proposed.

The usual ballot procedure should be followed, so that the members can vote for or against each and any of the proposed changes separately.

As regards the taking over of the ten years' lease and operation of the American Flying Club House; which has caused a deficit of upwards of $50,000 to that Club during the past year, the members and the absent Governors of the Aero Club of America are entitled to know in detail how it is proposed to make up such a deficit if it occurs, or how it is expected to prevent having large deficits, since the total dues of the present combined paid membership of the two Clubs is less than $50,000 a year, which is only half of the actual operating cost of the Flying Club for the past year. The method adopted also violates Section 13 of the Membership Corporation Law of the State of New York which provides that "No purchase, sale, mortgage, or lease of real property shall be made by a membership corporation, unless ordered by the concurring vote of at least two-thirds of the whole number of its directors, provided that when the whole number of directors is not less than twenty-one, the vote of the majority of the whole number shall be sufficient." It would therefore require thirteen favorable votes, cast by the Governors in person at a meeting of the Board, to adopt it, and this has not happened, therefore the Flying Club lease cannot be assumed by the Aero Club "as of date of August 1st", as has been stated in circulars.

In other words, the matter should be submitted to the members of the Club honestly and squarely, without any concealment of facts and purposes, and at least sixty days should be given to the members in which to study the proposed changes and make further inquiries, and obtain any additional information on the subject, so that the results will represent the desires of the majority of the members, as all important actions of membership corporations should, and will be in accordance with the State Laws.

Under Section 7 of the Membership Corporation Law of the State of New York no merger or consolidation of the Aero Club of America and the American Flying Club can take place without first complying with the provisions of that Section, which has not been done. Where a consolidation agreement does not comply with the requirements of the Membership Corporation Law, it is illegal and the Courts of Appeal have held that a single dissenting member of either Corporation may maintain an action to set aside the agreement. So long as there is such an overwhelming sentiment against consolidating the Flying Club with the Aero Club of America, it cannot be put into effect, and attempting to accomplish this by consolidation in violation of the State Laws, by any ruse, only leads to further legal actions and to restraining Court orders.

If you are in favor of the above stated plan to postpone all action until the regular annual meeting of November 8th, 1920, kindly return the enclosed proxy duly signed by you, to be presented at the Special Meeting of the Club to be held on August 28th, 1920, at the Club House, No. 297 Madison Avenue, New York City. If you have already sent a proxy for the meeting of August 16th, it will be mechanically revoked by the enclosed proxy.

Notice has been served on the Secretary of the Club that this Special Meeting is to be held on August 28th, and that the purposes of the said meeting of August 28th are, as already stated, to postpone action on the plan to assume large financial obligations and making changes in the Constitution and By-Laws of the Club until the regular Annual Meeting of November 8th, 1920; and that if the individuals who are holding the hasty meeting on August 16th, 1920, claim to have adopted a new Constitution and By-Laws, notwithstanding that they violate the State Laws, then legal action will be started immediately to restrain these individuals from involving the Club in any liabilities, and the members present in person and by proxy at the meeting of August 28th, will restore the present Constitution and By-Laws which were adopted legally by vote of the full membership of the Club, at regular annual meeting, and will take whatever action is necessary to protect the rights of the members.

The Aero Club of America will not be involved in any losses or obligations by postponing action until the regular Annual Meeting to be held on November 8th. The owners of the sumptuous Club House at No. 297 Madison Avenue, where the Club has had its headquarters since 1911, has offered to renew the lease for one year for $12,000, and the Aerial League of America has offered to take over the lease from the Club in November, if the members of the Club at the Annual Meeting should vote to move to other quarters at any time before or after November. This Club House is sumptuously equipped and so ideal also from a purely mechanical standpoint that it has been and is being operated at a total cost of less than $30,000 a year, including all Club official and House expenses, salaries, wages, heating, light and all other expenses.

The operating of the Flying Club, on the other hand, has cost over $100,000 during the past year, which has caused deficits of over $50,000. The Flying Club has less than 750 paid members and one of the terms of the proposed merger of the two Clubs is that the Flying Club members shall only begin to pay dues to the Aero Club of America on February 28th, 1921. The financial estimates show that even by increasing the dues of the resident members of the Aero Club of America, as proposed by the individuals who have called a meeting for August 16th, the income from dues from the combined membership of both Clubs would be less than $40,000 for the year ending November, 1921.

The Aero Club of America would therefore have to make up a deficit of over $50,000 for the year 1921 to operate the Flying Club House.

It is also well to state that the Aero Club of America has lived for nine years in its present sumptuous headquarters at 297 Madison Avenue, with a sixty day removal clause. On the other hand, the Flying Club lease has a clause which permits the owners to cancel the lease on short notice by paying $25,000, which provision mitigates against making the very costly mechanical alterations in the Flying Club building necessary to minimize the cost of operation, because every improvement made serves as an inducement to the owner to exercise his option to cancel the lease. On the other hand, if the mechanical alterations are not made the Club will lose over $25,000 quarterly in operating the house.

Of the two the Aero Club lease is the most favorable because the rent, taxes, light, heat, and other house expenses of the 297 Madison Avenue House will amount to less than $20,000 for the year ending November, 1921, as against over $50,000 for the Flying Club House which is less suited and not at all ideal for the Aero Club's use.

There are many apparent gross irregularities in the plans which it is proposed to adopt at the hasty "special meeting" called for August 16th. One of the most serious irregularities is the fact that although it is proposed to assume the ten years lease of the Flying Club House and operating expenses of the American Flying Club, which are known to have caused a deficit of over $50,000 during the past year to the said Club, the Governors of the Aero Club of America have not been able to secure a financial statement showing the extent of the liabilities to be assumed by the Aero Club of America in taking over the Flying Club lease and operation. A number of Governors requested this information at various times and were told by Messrs. Charles Jerome Edwards, Charles L. Poor, and James A. Blair, Jr., that they had been unable to secure this information. Under date of July 21st, Major Charles J. Glidden, a member of the Board, wrote to Mr. Edwards for this information and Mr. Edwards replied as follows:

> **"I have your letter of the 21st requesting certain information. I am not in a position and I doubt very much if either our Board of Governors or the Committee on Co-operation had the right to ask the American Flying Club for a certified statement of the Club in detail for the six months ending June 30th or for the gross expenses in detail for the same period; and in addition for the year ending June 30th.**
>
> **"And further, I doubt very much whether we have any authority to ask for a statement of their assets and liabilities, etc."**

It is therefore preposterous to expect the members of the Board of Governors to approve the assuming of such extensive liabilities, IN VIEW OF THE FACT THAT UNDER SECTION 11 OF THE MEMBERSHIP CORPORATION LAW OF THE STATE OF NEW YORK THEY WILL BE LIABLE FOR ANY DEBT OF THE CORPORATION CONTRACTED WHILE THEY ARE DIRECTORS, PAYABLE WITHIN ONE YEAR AFTER THE DEBT BECOMES DUE; therefore they would be personally responsible for deficits amounting to over fifty thousand dollars during the coming year incurred in taking over the lease and operating the Flying Club House, even if they should resign or end their connection with the Aero Club of America at this time. No such agreement as proposed can be entered into without also violating two other sections of the State Laws.

These Governors cannot, therefore, under the laws of the State of New York, relieve themselves of the responsibilities of deficits incurred in taking over the lease and operating the said Flying Club, except through legal action similar to the action started by Mr. Henry Woodhouse, and each of the Governors who are interested in Mr. Woodhouse's action will feel compelled to start a similar legal action themselves, to protect themselves from the liabilities above stated.

It is only fair to state that most of the Governors of the Club are absent either in Europe or on their vacations and have not had the opportunity to go over the actual facts in the case, and their names are used in statements circulated to secure proxies for the hasty meeting of August 16th, without their knowledge and without their approval of the assertions made in said circulars, which assertions are not in accordance with the facts as reported in the stenographic minutes of the meetings of the Board of Governors of the Club. They do not know that the State Laws are being violated.

It is also well to state that this small group of Governors of the Club who are proposing this radical step have not assisted the Club financially or participated in Club activities since 1912 and 1914 when the Aero Club was turned over insolvent to what became known as the "Hawley-Woodhouse-Peary Administration", which was done by the following resolution, dated June 3rd, 1914. On that date, after the other Governors of the Club had abandoned the Club to the alternative of going into bankruptcy or out of existence, and after it had already been decided to give up the Club House and move to small side street offices, Mr. Woodhouse offered to save the Club by starting at his own expense activities and conducting a campaign for the increase of membership. His offer was accepted by the following resolution, dated June 3rd, 1914:

> **"After due consideration and exchange of opinion it was decided that Henry Woodhouse be authorized to push forward without any delay his plan verbally outlined at the meeting, viz.: that of circularizing two thousand persons soliciting their membership for the**

Club, it being understood that the sum to be expended in this effort must not exceed $200, and that the date of August 15th, 1914, be fixed to terminate and decide this issue of this plan, it being the sentiment of the Board that if not successful, other quarters for the Club be found."

Messrs. Woodhouse, Hawley and Admiral Peary thereupon assumed the responsibility of solving the financial problems of the Club, and entirely at their own expense and by personal efforts, which were authorized, approved and praised periodically by the Executive Committee and the Board of Governors, conducted the enormous patriotic and progressive campaigns on behalf of the Aero Club of America which resulted in the Club securing over two thousand members. Mr. Woodhouse paid the major part of these expenses.

In view of the fact that the individuals who are now trying to make the Aero Club of America assume the ruinous obligations of taking over and operating the American Flying Club failed in the past eight years to assist in solving the problems of making the Aero Club of America self-supporting, and also failed to assist in activities which made the Aero Club of America a great national institution and a moral force, there is no assurance that they would assist in solving the much heavier financial problems of making the Aero Club of America self-supporting if it assumes the heavy liabilities connected with taking over the lease and operation of the American Flying Club, which caused a deficit of over $50,000 during the past year to the said Club.

For this additional and important reason it is necessary in fairness to the Governors and members of the Aero Club of America, and to comply with the State Laws, to insist that a financial plan of operation be submitted for the approval and vote of the whole Board of Governors and the entire membership of the Club before such huge financial liabilities are incurred.

UNDER THE MEMBERSHIP CORPORATION LAW OF THE STATE OF NEW YORK, SUPPORTED BY NUMEROUS COURT DECISIONS, IT WILL NOT BE POSSIBLE FOR THE GROUP OF INDIVIDUALS WHO HAVE CALLED THE HASTY MEETING OF AUGUST 16TH TO LEGALLY CARRY INTO EFFECT THEIR PLANS, AS ANY MEMBER OR GOVERNOR OF THE AERO CLUB OF AMERICA MAY MAINTAIN AN ACTION TO SET ASIDE ANY AGREEMENT WHICH SAID INDIVIDUALS MAY NEGOTIATE IN THE NAME OR ON BEHALF OF THE CLUB. A number of such legal legal actions will be instituted if an attempt is made to make the Club assume any liabilities or to take any action not approved by the membership of the Club after submitting all the facts to the entire membership for consideration and approval, as already stated.

But further legal actions will be unnecessary and the present legal actions will be ended if you and the other members of the Club will sign the enclosed proxy and mail it to the Committee in the enclosed envelope, which requests postponing action until the regular annual meeting to be held on November 8th, 1920, which will permit the entire membershp to pass upon the issues involved and approve or disapprove the proposed plans.

In view of the facts that statements have been made to the effect that an objection to the present status is that Mr. Henry Woodhouse owns the magazine *Flying*, it is only fair to state here that the magazine *Flying* was owned by the Aero Club of America and when it was decided to discontinue its publication in 1912, on account of the fact that it had a monthly deficit of $1,200, Mr. Woodhouse offered to publish it and save the unfavorable reflection which would have resulted to the Club if the magazine had been discontinued, and he assumed the deficit connected with the publishing of the said magazine and has generously supplied the Club ever since with copies of *Flying* for its members at the low cost of from 6c per copy to 15c per copy, averaging less than half the actual cost of publishing.

Mr. Woodhouse has been making these monthly contributions to the Club since 1912 and the records show that his total contributions to the Club's Treasury and the Club's activities cost Mr. Woodhouse over $50,000.

The Minutes of the meetings of the Club contain many resolutions and expressions of appreciation of the importance and value of the support given to the Club by the magazine *Flying* and by Mr. Woodhouse personally, therefore the reference to his ownership of the magazine *Flying* cannot be made in good faith, with the knowledge of the actual facts in the case.

The accompanying letter addressed to the Secretary of the Aero Club of America gives the evidence that the proposed hasty meeting of August 16th is irregular and illegal and gives evidence that the changes in the By-Laws proposed for adoption at the meeting of August 16th are irregular and illegal, one of the reasons being that they would abolish the rights of the Governors and members of the Club and would give despotic power to the three members who have appointed themselves a Proxy Committee, to make the Aero Club of America assume ruinous financial and moral obligations.

They also aim to abolish by this hasty action the complete Board of Governors of the Aero Club of America, notwithstanding the fact THAT SAID BOARD WAS DULY ELECTED AT THE REGULAR ANNUAL MEETING OF THE CLUB BY VOTE OF THE ENTIRE MEMBERSHIP OF THE CLUB AND THAT UNDER THE LAW OF THE STATE OF NEW YORK, DULY SUPPORTED BY COURT DECISIONS, INCLUDING THE COURT OF APPEALS, DIRECTORS OF CORPORATIONS CANNOT BE REMOVED BY SUCH METHODS, AND LEGAL ACTIONS ON THIS POINT ALONE WOULD PREVENT CARRYING INTO EFFECT THE PLANS WHICH ARE BEING CONSIDERED FOR THE AUGUST 16TH MEETING.

The letter referred to, and also containing the analysis of the so-called revisions of the By-Laws proposed for adoption at the hasty meeting of August 16th, is printed herewith as follows:

To the Secretary,
Aero Club of America,
297 Madison Avenue, New York City,

Dear Sir:

The undersigned, being Governors and members of the Aero Club of America, in good standing, and also holding the proxies of a number of additional Governors and members of the Club, are deeply concerned about the methods employed and the purposes of the so-called "Special Meeting" of the Club, and find it imperative to take steps to protect the financial, legal and constitutional rights and privileges of the members of the Club and protect and maintain the membership Corporation Law of the State of New York and the Constitution and By-Laws and traditions of the Club, which have made the Club a great national institution and a powerful moral force.

During the week ending July 28th, 1920, you requested a number of members of the Aero Club of America to sign a paper reading as follows:

"PROPOSAL

"The undersigned members of the Aero Club of America hereby propose that the Constitution of the Aero Club of America be amended, or the present Constitution rescinded and a new Constitution adopted, so as to read as per copy of such proposed, amended or new Constitution hereto annexed.: . . ."

A number of the members who signed said paper at your request state that the purpose of this document was represented to him by you as being simply to conduct some "routine club business", and they were told that the matter besides being only "routine club business" had been duly approved by the Board of Governors of the Club. Subsequently, when you were asked to state your authority for these irregular actions, you stated that you had been ordered to do so by the Acting President of the Club. . . . .

Now, members who signed this paper at your request find that their signature was obtained under misrepresentations, and find that their signatures have been used to call a special meeting and to appoint the three members of the Club, who are defendants in the action now before the Supreme Court, namely Charles Jerome Edwards, Charles S. Poor and James A. Blair, Jr., as a proxy committee with power to vote said proxies at a meeting to be held on August 16th, and that one of the purposes of this short-notice meeting is to adopt so-called "proposed revised by-laws" which violate the Membership Corporation Law of the State of New York and entirely abolish the legal rights of members and Governors of the Aero Club and are intended to enable the three members above named to turn over the control of the Club to certain interests and wipe out the Aero Club's Treasury surplus and make the Club assume the ruinous operation cost of the American Flying Club, which has involved a deficit of over $50,000 during the past year, and could not be operated without a deficit of at least $40,000 a year even by doubling the present membership of the Club and increasing the membership dues, as proposed in the so-called "proposed revised by-laws."

Members who signed said "proposal" at your request and under the stated representations made by you find that the so-called "proposed revised by-laws", which they have obtained since, contain the following proposed new and despotic changes in the By-Laws of the Club, some of which violate the Membership Corporation Laws of the State of New York, which you failed to mention to them when you requested them to sign the above mentioned paper:

Under the heading "Elections," Chapter II of the By-Laws the defendants propose the following new and vicious and

(*Continued on page* 784)

The News of the Week

Name Pilots to Race American Planes

The three aviators designated to fly the aeroplanes in the International Aeroplane Race in France representing the United States are as follows:

Representing the Air Service of the United States Army, Major R. W. Schroeder; the Dayton Wright Company, Howard M. Rinehart; the Aero Club of Texas entry of S. E. J. Cox, using a Curtiss Aeroplane christened the "Texas Wild Cat," Roland Rohlfs.

J. L. All-Metal Planes Reach Pacific Coast

Two of the three JL all-metal monoplanes which left Central Park, Long Island, on July 29, to blaze an aerial route for a transcontinental aerial mail service landed at the Oakland flying field, Oakland, California, on August 8.

J. M. Larsen, owner of the planes, delivered to Postmaster Joseph J. Rosebrough a package of New York mail, constituting what was said to be the first transcontinental aerial mail delivery on record.

Balloon Races at Indianapolis Halted

Indianapolis.—Plans for the national and international balloon races, which were scheduled to start from the Indianapolis Motor Speedway in September and October, seems to have come to a halt through the refusal of the Citizens' Gas Company here to provide the gas to inflate the air craft.

Word of the hitch in the arrangements has been telegraphed to Major Charles J. Glidden of New York, Chairman of the Racing Committee of the Aero Club of America, by Theodore E. Meyers, manager of the Speedway.

The Indianapolis Chamber of Commerce is trying to find a way out of the difficulty so that the races may be held as planned.

Cities Offer Cash to Trophy Racers

Cash prizes for the fastest flying time between various cities along the route of the transcontinental race for the Pulitzer Trophy are practically a certainty, according to Major Charles J. Glidden, Acting Chairman of the Aero Club of America, which is sponsoring the race. Already many requests have been received from various cities on the coast-to-coast aerial mail route that the flyers stop on their landing fields.

These requests, according to Major Glidden, are generally accompanied by the suggestion that the city or local Chamber of Commerce be permitted to offer a cash prize to the flier making the fastest time between New York and their landing field.

Augustus Post, Secretary of the Aero Club, received a telegram yesterday from Charles Jerome Edwards, Acting President of the club, who is now on his way to San Francisco. The message read as follows:

"Immensely pleased by announcements in Western newspapers that you have decided to hold a transcontinental race for the Pulitzer Trophy. Great interest in contest displayed by every one I have talked with. Please extend my congratulations to the Contest Committee."

Mr. Post dispatched the following wire to Mr. Edwards last night: "The Contest Committee appreciates highly your kind sentiments expressed in your telegram and reports that the New York newspapers are also giving much attention to the transcontinental race, which will do much to help the club and aviation generally."

To-morrow a meeting will be held by the Contest Committee of the club to decide on the rules which will govern the race.

Photographing Haiti's Coast Line With Aeroplanes

The present strength of the Marine Corps aviation force in Haiti is ten officers and ninety-nine enlisted men, and the organization, Squadron E, is engaged with Squadron D, of Santo Domingo, comprising eight officers and eighty-four men, in making a photographic survey of the entire coast line of the island of Haiti, under the direction of the interior department of the U. S. Military Government of the island. Several officers who have completed the course in aviation at the Quantico Marine Air Station will be sent to Haiti at an early date to assist in this work.

First Aerial Mail Between Seattle and Yakima

Carrying the first mail ever sent across the Cascade mountains by aeroplane, a standard, Curtiss OX5, piloted by Rudolph I. Erlichman, made a non-stop flight of two hours and 25 minutes from Seattle to Yakima, Wash., recently. Mr. Erlichman, who flew as army instructor during the war, had the thrilling experience of passing through three heavy electrical storms while in the mountains. He carried, besides the sack of mail, $2,000 worth of jewelry from a Seattle firm to a customer in Yakima. The Yakima Aviation Company, of which Mr. Erlichman is manager, hopes soon to get a contract with the government to carry mail regularly across the Cascades.

Military Services for Late Lt. O. J. Locklear

A military funeral was held at Fort Worth, Texas, on Aug. 7th for the late Lieut. Omer J. Locklear, under the auspices of the American Legion. Aeroplanes from Barron Field and Talliaferro Field dropped flowers on the procession.

Lieut. Locklear served with the U. S.

Attorney General Requests Memorandum Setting Forth Names of Witnesses in Conspiracy Charges

THE awaited for action of the United States Attorney General on the request made by Mr. Henry Woodhouse, editor and publisher of *Aerial Age Weekly* and *Flying,* to institute investigations before the Federal Grand Jury, so as to enable Mr. Woodhouse to submit evidence which will enable the Government to obtain refunds from manufacturers and individuals who have obtained Government funds illegally and have conspired against the Government, took substance today through the following letter received by Mr. Woodhouse from the Department of Justice, signed by Assistant Attorney General R. P. Stewart.

The letter received by Mr. Woodhouse reads as follows:

"DEPARTMENT OF JUSTICE,
Washington, D. C.

"Henry Woodhouse, Esq.,
280 Madison Avenue,
New York, New York

August 6, 1920.

Sir:

"Referring further to your letter of July 6th, 1920, in which you offer to submit conclusive evidence that the Government has been made the victim of a deep-set conspiracy organized and conducted by agents of the Manufacturers Aircraft Association through which that Association has obtained large payments of public funds not authorized by Congress, you are requested to furnish this Department a memorandum setting forth in detail the names of the witnesses by whom you expect to prove a conspiracy and the exact facts to which each witness can testify with any brief statement you deem it proper to append tending to show the formation and operation of the conspiracy.

"It is suggested that you also furnish a copy of such memorandum to the United States attorney for the proper judicial district in order that the Department and the United States attorney may definitely determine whether the facts alleged constitute a proper matter for investigation by a Federal Grand Jury.

"Respectfully,
"For the Attorney General,
(Signed) "R. P. STEWART,
"Assistant Attorney General."

Mr. Woodhouse's letter to Attorney General A. Mitchell Palmer was printed in AERIAL AGE, July 12, 1920.

Air Service at Fort Worth, Texas. He is said to have been the first aviator to change from one aeroplane to another in the air.

Regular Delivery of Newspapers by Plane

The Oregon, Washington and Idaho Airplane Company, located at Portland, Ore., is one of the largest aviation companies on the Pacific coast. General manager Victor Vernon is well-known in the aviation world, having been with the Curtiss Aeroplane and Motor Corporation for some time.

At present the field equipment consists of eighteen aeroplanes, including JN-4-D's, Curtiss-Standards, Canucks, Orioles, Seagulls and F-boats.

The personnel of the company comprises nine pilots and ten mechanics besides the office force.

The company has a contract to deliver the afternoon edition of a local newspaper to Seaside, a distance of a hundred and twenty miles. This service has been in operation since June 16th and the hydroaeroplane has not missed a delivery to date.

To Hold Aerial Picnic

The first aerial outing and picnic in the United States will be held at Hammondsport, N. Y., on Friday, August 20.

Arrangements are being completed by Harold C. Kinne, of The Aero Club of Buffalo; A. K. Ainlay, of the Aerial Service Corporation of Hammondsport, and the president of the Chamber of Commerce of Hammondsport, assisted by the Airship Manufacturing Company of America, located in Hammondsport, and an active and interesting program is being laid out.

Ten aeroplane owners from Western New York State have signified their intention of attending by the aerial route and at least twenty more are expected from the skies. In addition a large attendance will be drawn from the various aero clubs, including the Aero Club of Buffalo, The Aero Club of Rochester, Syracuse Aero Club, Cleveland Aero Club, and the Aero Club of Albany.

First Aerial Elopement in Northwest

The northwest's first aeroplane elopement was staged at Yakima, Wash., by Lawrence Brown, a naval aviator during the war, now pilot for the W. O. Butler Aviation Company, and Miss Cordelia Dale Richards, stepdaughter of Andrew Bunnell of Goldendale. The elopers flew from Goldendale to Yakima, after first making a flight to The Dallas, where they could not get a license.

Concord, N. H., Enthusiastic About Aviation

The Concord Aircraft Company, of Concord, New Hampshire, is successfully operating a passenger-carrying, exhibition, aerial advertising, and aerial photography service. They are using two aeroplanes, an Avro and a Canadian Curtiss.

The flying field is the State muster grounds, located one mile east of Concord. The field is 1,500 ft. by 1,300 ft., and very smooth and even. The Chamber of Commerce of Concord has purchased 90 acres on the State boulevard, two miles south of Concord, and this will be cleared and made suitable for a landing field. Hangars are to be erected and every facility provided for transient aviators and aeroplanes.

Much aviation enthusiasm is being displayed in New Hampshipe and Concord will no doubt be one of the leading aviation centres of the country.

Ezra Meeker, 90 years old, pioneer of the Old Oregon Trail, who recently made a flight over the ox team route with pilot N. B. Mamer of Spokane, Wash.

Plan Second Transcontinental National Race

The Board of Governors of the Aero Club of America have voted, that complying with the request of the Mayor of Los Angeles, California, The Aero Club of Southern California and others, a second transcontinental National Aeroplane Race be arranged for by the Contest Committee for the Pulitzer Trophy and cash prizes from New York to Los Angeles via the Southern route during the months of January, February or March, 1921.

Aeroplane Wins Race with Motorcycle

More than 6,000 persons witnessed a race recently between a Curtiss JN-4H, aeroplane, owned and piloted by E. G. Bridges, of Anderson, Indiana, and a motorcycle driven by Charles Michaels, a professional rider, of Newcastle, Ind., on a five-mile straight paved surface of the Main street road in Anderson. Mayor Black, of Anderson, gave the starting signal, and the aeroplane and motorcycle both got away to a good start. The aeroplane won easily in less than three minutes, with Bridges slowing down toward the finish. Michaels slowed up at one point where the road was crowded. At the start he dashed away ahead of the plane and held the lead until Bridges added more power, overtook the motorbike and crossed the line about 250 feet ahead. The race was the result of a challenge by a local motorcycle club. Mr. Bridges, who is a manufacturer, trained in aviation during the world war.

Locate By Aeroplanes Body of Drowned Man

Spokane, Wash.—M. V. Mamer and C. H. Messer, of the U. S. Aircraft Corporation, Spokane, returned from Great Falls, Montana, where they successfully executed a commission to locate the body of a man drowned in the Missouri river. Scouting at a height of 300 feet above the water the aviators were able to locate the body.

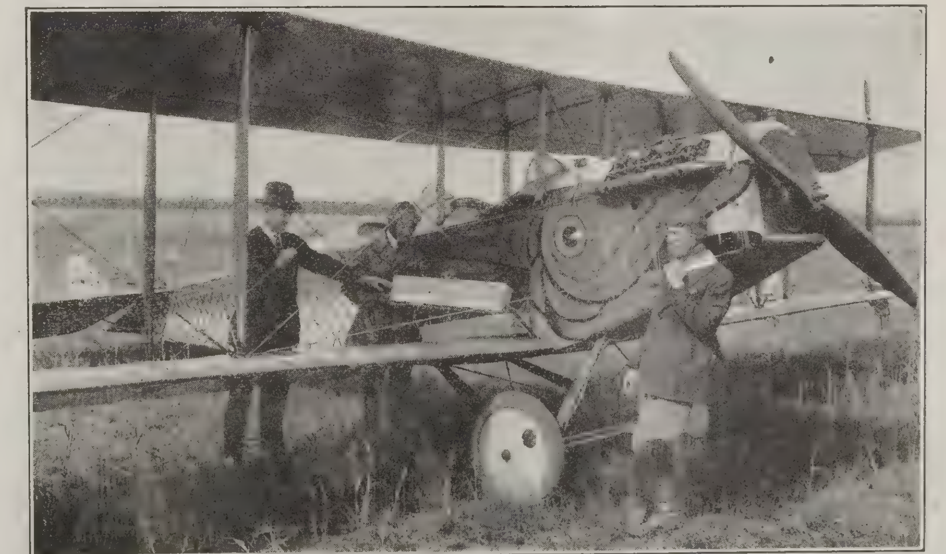
New Aviation Company at Dowagiac, Michigan

A new aviation enterprise has been formed in Dowagiac, Michigan, and is known as the Heddon Aviation Company. Mr. Charles Heddon, of James Heddon's Sons, makers of high grade fishing tackle, is president of the corporation, and Henry F. Fawcett is general manager.

The company now has three aeroplanes, one of which is shown here painted up to resemble a fish. Their machines are known as the Flying Fish aeroplanes. At present the planes are making deliveries of Heddon's fishing tackle, covering the states of Michigan, Indiana, Ohio, Illinois and Wisconsin. A regular aerial service is also carried on, such as passenger flights and exhibition work.

Two more aeroplanes are to be added to the equipment, and they will probably be of the three-seater type. The company has a good flying field at Dowagiac, consisting of 40 acres with a hangar and repair department for accommodation of four aeroplanes.

Mr. Fawcett, who is also pilot for the company, was an instructor at Love Field, Dallas, Texas, during the war, and has been engaged in commercial flying since then. Last year he made a flight from northern Indiana to Fort Worth, Texas, and Monroe, Louisiana. Recently Mr. Heddon made a very good trip with Pilot Fawcett from Toronto, Canada, to Dowagiac, a distance of approximately 409 miles.



Aeroplane of the Heddon Aviation Company of Dowagiac, Mich., painted up as a Flying Fish to advertise the famous Heddon fishing gear

The AIRCRAFT TRADE REVIEW
N. E. J.

Aero Limited Carried 700 Passengers in July

A statement has been issued by the Aero Limited showing the number of passengers carried in their planes during the month of July. It shows a gain of nearly 300 over the month previous, proving the popularity of aerial travel is increasing. It is a significant fact that 700 passengers were carried in July, although U. S. Weather Bureau Statistics shown there were fourteen days of rain during the month. Statement of passengers carried July 1st to July 31st, 1920:

July	1	2
”	2	51
”	5	88
”	6	79
”	7	2
”	9	5
”	11	16
”	13	33
”	14	30
”	15	8
”	16	31
”	17	4
”	18	42
”	20	24
”	21	10
”	22	11
”	24	2
”	25	109
”	26	5
”	27	39
”	28	2
”	30	15
”	31	92
	Total	700

Southern Aeroplane Co. Conducts Landing Tests

Charlotte, N. C.—The Southern Aeroplane Company has been conducting during the past week at their new field here a series of remarkable landing tests. The machine used was a Farman three-passenger "Tourabout" model. These tests were to determine the amount of distance the machine rolled from the time its wheels touched the ground until the machine stopped completely.

There was no wind at all and the landing ground was hard and level.

What is claimed to be an American record was made by H. R. Tucker, President of the Company, as pilot and his two extra passengers, the plane landing and coming to a dead stop in 38 feet.

None of the landings made by Mr. Tucker or other pilots of the company were in excess of seventy-five feet.

It is to be hoped that more experiments of a like nature will be tried. Aviation enthusiasts around Charlotte consider these tests a great boost to aviation.

Start Night Passenger-Carrying Flights

The Flagg Aeroplane Company of Orange, Mass., has had such great success in the passenger-carrying service that they have instituted a night passenger service also, which is made possible by the aid of automobile lights focused on the field.

Lt. Rouse is now flying for the Flagg company.

Hammondsport to Have an Aviation Day

An Aviation Day will be held at Hammondsport, N. Y., on Saturday, August 21st, under the auspices of the Hammondsport Chamber of Commerce, the Aerial Service Corporation and the Airship Manufacturing Company of America.

During the day there will be exhibition aeroplane flights, races and passenger carrying events. This will be a most enthusiastic aviation gathering and many of the old timers will be present.

Avro Aeroplane Flies from New York to Minneapolis in 16½ Hours

An excellent flight in an Avro aeroplane was made recently by aviator Wilbur Larrabee when he flew from New York to Minneapolis, Minnesota, in sixteen and one-half hours flying time. He left New York one day and arrived in Minneapolis the next, thus being the first to make such a record.

The aeroplane belongs to the Security Aircraft Company of Minneapolis, which is operating aerial photography, advertising, passenger carrying and flying instruction service, together with a repair and general aeroplane supply station there.

Aerial Service at Paris, Illinois

Pilot Archie S. Hickman and Frank Slaughter have taken to Paris, Illinois, a new Standard J-1 aeroplane equipped with a Curtiss OX-5 engine. They are operating a passenger carrying service there with it.

The plane was purchased in Kokomo, Ind., and flown to Paris by aviator Hickman who was an army pilot during the war.

A regular aerial service will be established such as aerial photography, advertising and cross-country flying. It is planned to have a permanent flying station at Paris.

Mr. George Firman, manager of the Little Rock (Ark.) Board of Commerce, who is doing excellent work for aeronautics in his State

Promote Aviation Work in Washington

A campaign of education intended to prepare the people of the State of Washington for aerial mail and commercial aviation in all its phases is progressing under the auspices of the Yakima Aviation Company.

Two of the company's planes are at present demonstrating through exhibition, passenger carrying and general propaganda the versatility, safety and practicability of the aeroplane, doing flying in some hundred towns and cities of eastern Washington. The three ex-air service men out on this work are urging business men of the various communities to put in municipal fields, and as a result most of the places visited are now engaged in buying or leasing suitable fields for aviation grounds.

Rudolph I. Erlichman, manager, is piloting one of the planes, while A. J. A. Black runs the other ship. Charles E. Cutter, Jr., is making arrangements ahead of the planes as advance agent.

Ralph H. Upson From Akron, Ohio

In our issue of July 12 mention was made of an announcement by the Aero Club of entries in the national balloon race to be held at Indianapolis, Ind., September 11, 1920, and stating Ralph H. Upson as representing Indianapolis. It should read Ralph H. Upson of Akron, O.

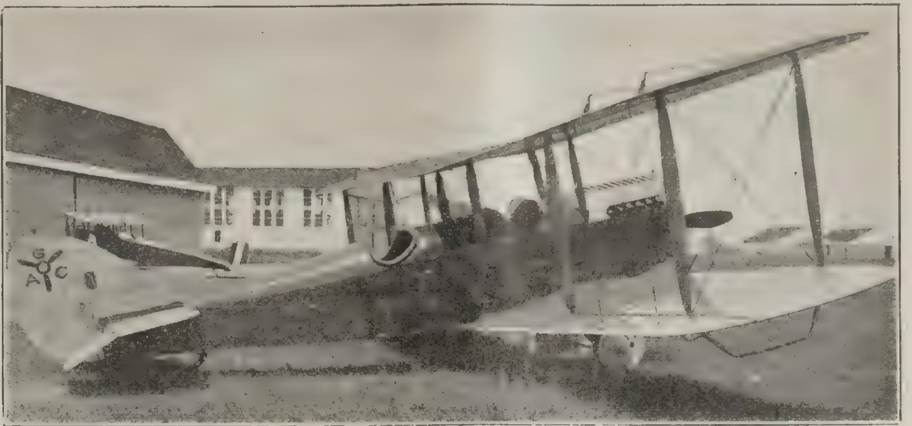
Advocates Aviation Future in Little Rock

Mr. George Firman, manager of Little Rock Board of Commerce, Little Rock, Ark., is a most enthusiastic optimist in the future of commercial aviation. Realizing the importance aeronautics is playing in commercial activities now and in the future will hold, he began months ago advocating a complete first-class municipal landing field for Little Rock.

Mr. Firman has also been urging that the Aviation Supply Depot at Little Rock be placed on flying status and in having a flying field set aside at Camp Pike, the army post presented to the Government without cost by the business men of Little Rock.

Realizing that the advent of commercial aviation and aerial transportation for the Southwest would, if centralized in his city, make Little Rock a base for this important new industry, Mr. Firman is now active in an enterprise destined to place Little Rock among the foremost progressive cities of the country in fostering aeronautics. This movement, headed by a committee of Little Rock business men, includes a $50,000 subscription to aerial development, and is being carried out under the auspices of the Interstate Airplane Company, in connection with their establishing well-equipped base flying fields to serve the aerial transportation lines soon to be in operation in the Southwest.

THE GALLAUDET C-3 LIBERTY TOURIST PLANE



Side view of Gallaudet Liberty Tourist plane

THE latest product of the Gallaudet Aircraft Corporation, of East Greenwich, R. I., is the Gallaudet C-3 Liberty Tourist plane, which has completed most satisfactory trials. This aeroplane, having a seating capacity for five persons, has been designed for pleasure and commercial flying, and all the essentials of reliability, safety, speed and endurance are contained in its development.

In the construction of the C-3, DH-4 fittings have been used throughout, thus by using these fittings and other standardized parts an easy replacement and reasonable first cost is assured.

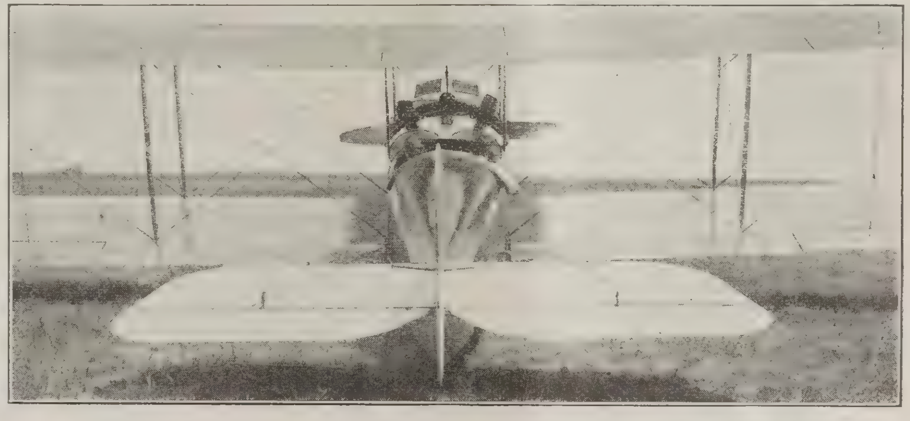
This machine was also designed to carry freight, and is the first of its kind in America to be developed for such work. By removing the seats in the forward cockpit, which is designed to seat three persons, a freight compartment of 112½ cubic feet is available. The three persons in the front cockpit sit side by side, as do the two in the rear cockpit, which is equipped with all-steel dual controls.

The C-3 had its first trials at Hazelhurst Field, Long Island, recently, proving very successfully all tests. It was flown back to the Gallaudet factory in East Greenwich, R. I., a distance of 140 miles, in one hour and twenty-three minutes.

The maximum speed of the plane is 125 miles per hour and the landing speed between forty and forty-five miles per hour. The machine is powered with a 400 horse-power twelve cylinder Liberty engine. A cross country tour is to be started with the C-3 for demonstration purposes, the route planned being, New York, Washington, Dayton, Akron, Cleveland, Chicago, St. Louis, to Fort Worth, Texas, with stops at several points on the route.

The fuselage of the C-3 is of the usual four longeron type, covered with veneer from nose to tail. It is constructed with a view to passenger comfort, the cockpits being sufficiently deep to afford protection without being entirely enclosed.

The horizontal stabilizer is of the adjustable type, which by an appliance within easy reach of the pilot enables him to adjust it from neutral to 1½° positive or negative angle.



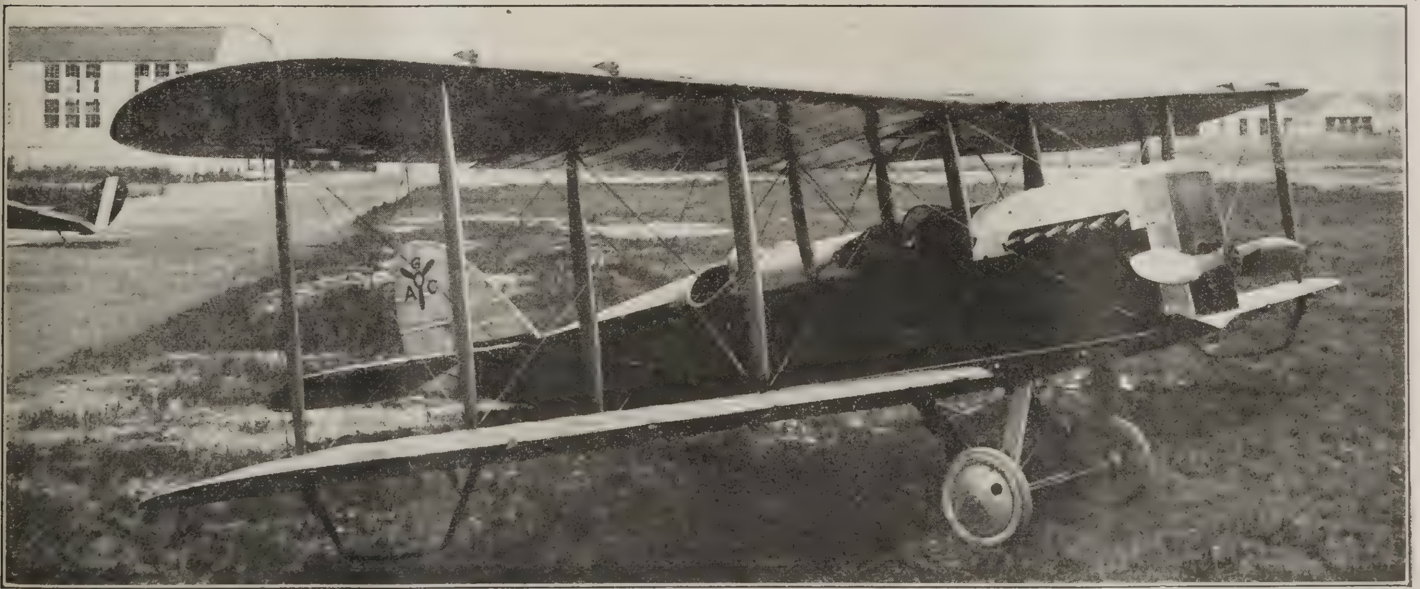
Rear view of Gallaudet Liberty Tourist plane, showing seating arrangement for five persons

The gas supply system consists of a seven gallon gravity tank located in the top centre section which is fed from a main 115-gallon tank located under front seats by two separate centrifugal pumps, air driven, either of which is capable of keeping up the full supply of gas.

The instruments in the rear or pilot's cockpit are clock, air-speed indicator, altimeter, compass, oil pressure gauge, thermometer, gas gauges, tachometer, switches and throttle. In the forward cockpit are clock, altimeter and air-speed indicator.

Characteristics of Gallaudet C-3:

Wing span	44 ft.
Length overall	29 ft. 5 ins.
Chord	7 ft.
Gap	6 ft.
Stagger	8 ins.
Height	10 ft. 3 ins.
Dihedral	1½°
Angle of incidence	2°
Wing curve	A. F. 15
Wing area	48 sq. ft.
Useful load	1,800 lbs.
Weight, loaded	3,800 lbs.
Loading, per H. P.	11.1 lbs.
Wing loading	8.5 lbs. per sq. ft.
Cruising radius	500 miles
Ceiling	18,000 ft.
Maximum speed	125 m. p. h.
Loading speed	40 to 45 m. p. h.



Three-quarter side view of Gallaudet Tourist plane, equipped with 400 H.P. Liberty engine

DURALUMIN

By E. Unger and E. Schmidt *

Translated From Technische Berichte, Vol. III—Section 6, By Starr Truscott, Aeronautic Engineer, Bureau of Construction and Repair, U. S. N.

THE use of duralumin in the construction of aircraft makes an account of the properties of this material desirable especially with reference to its working qualities as developed by experience.

Composition, Specific Gravity and Melting Point

Duralumin is made in various compositions and has, with the exception of small quantities of impurities, the following composition:

Aluminum	95.5 to 93.2 percent
Magnesium	.5 percent
Copper	3.5 to 5.5 percent
Manganese	.5 to .8 percent

Lead, tin and zinc which, as is well known, have an unfavorable influence upon the permanence of aluminum alloys, are not found in duralumin.

The specific gravity of duralumin varies according to composition and hardness from 2.75 to 2.84. The melting point is about 650° C.

Duralumin is made under this name by the Durener Metallwerke, Duren (Rhld), and under the name of Bergmetall by Carl Berg, Eveking (Westf.)

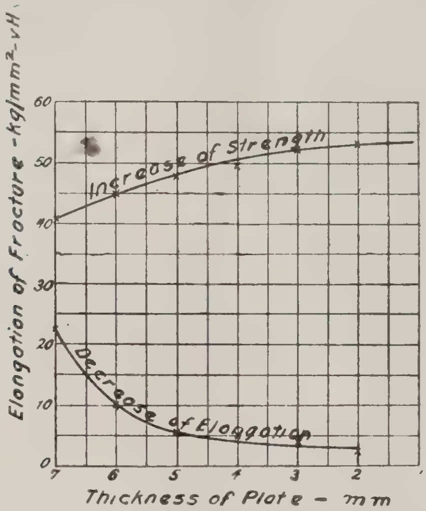


Fig. 1

Working of Duralumin

Like other metals, duralumin can be rolled into plates and shapes and behaves in a similar manner, in that the elongation decreases as the hardness of rolling increases. Tube blanks, however, can be made only by pressing and not by the oblique rolling method.

Fig. 1 shows the increase in tensile strength and decrease in elongation of a duralumin plate as its thickness is reduced by cold rolling from 7 mm. to 2 mm. The strength increases from 41 kg. to about 54 kg. per sq. mm., while the elongation falls from 22.7 to 2.3 percent. The curve shows that the elongation decreases very rapidly with the very first reduction in thickness.

However, duralumin can be worked hot at a temperature of about 400° C. very well.

Tempering

Duralumin can be tempered, like steel, by heating and sudden cooling. For this purpose plates, tubes, and shapes are heated to between 480° and 510° and quenched, then aged; that is, the treated material is simply set aside. The original strength characteristics are very nearly restored after the quenching but the tensile strength continues to grow with the time of aging, from 35 to 50 kgs. per sq. mm. The elongation does not decrease but remains at least the same and usually increases slightly. In practice the greatest strength is reached after about 5 days of aging.

When heated to over 530° C. duralumin becomes unusable. Consequently the treating is carried on in a bath of nitrates whose temperature can be carefully regulated and watched. During the aging of the metal, work cannot be done on it which would change the section as in that case the strength will not increase any more. After the completion of aging, the material can be re-rolled in order to obtain smooth surfaces. The strength is thereby increased at the expense of elongation.

Fig. 2 shows the increase of strength during aging. The tensile strengths were determined by the Ericson test with 0.385 as a coefficient. This value was obtained from the experiments described below.

Experiments have been made (see Fig. 3) by the Durener-Metallwerke to determine the most favorable quenching temperature. The curve "a" shows the variation in the strength of duralumin which had been aged for 4 days with the variation of quenching temperature. Curve "b" shows the strength immediately after the quenching. The strengths were determined in both cases by the Ericson test.

As the material may warp in tempering it is not good practice to temper riveted parts. Such parts should be tempered before they are riveted.

Strength Properties

Duralumin is delivered in various compositions which have different properties according to the purpose for which it is intended to be used. It is therefore important that the concern supplying the material should be informed regarding the nature of the working proposed. In Table 1 below are assembled the strength figures of some duralumin compositions made by the Durener-Metallwerke.

Symbol for Composition	Condition	Method of Preparing	Elastic limit kg/mm²	Tensile strength kg/mm²	Elongation in %	Modulus of elasticity kg/mm²	Sections available
681b ⅓	Tempered only	Tempered	24 to 26	38 to 40	20	About 500,000	Tubes, plates, strips, bars & shapes
681b ⅓	½ hard	Tempered and cold rolled	30	40 to 42	16 to 14	500,000	Tubes, plates, strips, bars
681a	Tempered only	Tempered	25 to 27	38 to 40	20 to 18	600,000	Tubes, plates, strips, bars & shapes
	Hard	Tempered and cold rolled	30 to 32	44 to 46	11 to 10		Tubes, plates, strips, bars & shapes
681h	Tempered only	Tempered	26 to 28	38 to 42	18 to 15	600,000	Tubes, plates, strips, bars & shapes
	Hard	Tempered and cold rolled	32 to 34	45 to 48	11 to 10		Tubes, plates, strips, bars
N	Tempered only	Forged rivets are tempered	20	32 to 34	18 to 14	Shear strength up to 6 mm. dia. 25 kg/mm²	Finished rivets

The modulus of elasticity of the hard composition 681a was found by the Technischen Hochschule Aachen to be 700,000 kgs. per sq. cm. Making allowance for the possible effect of vibration on the modulus of elasticity it appears better to use not more than 650,000 kgs. per sq. cm. in computations.

In judging as to the suitability of a material for use in stressed parts not only the tensile strength but also the ductility is of great importance. This can be determined by bending strips backward and forward through 180° over a definite radius—usually 5 to 10 mm.—the number of bends before fracture being taken as a measure. Other conclusions as to the ductility can be obtained from the Ericson test (see Fig. 4). The plate to be tested is pressed through a ring, "b," by a head, "a," until a tear shows on the upper surface of the sheet. The depth of the impression is then a measure of the ductility.

In Table 2 there are compared strength values, numbers of bends (over 5 mm. radius and through 180°) and depths of impression as observed on Bergmetall plates and steel plates of equal thicknesses.

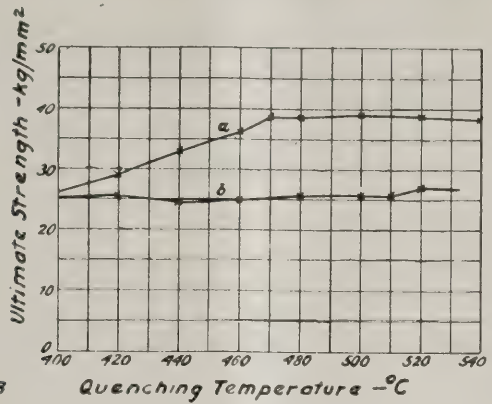


Fig. 3

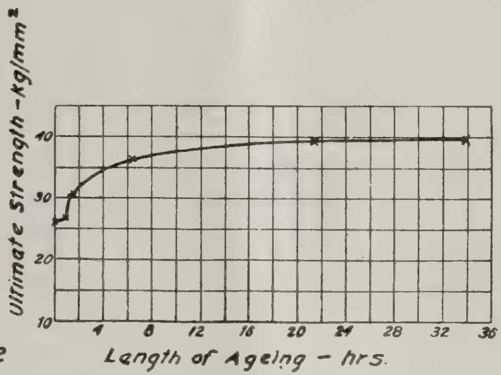


Fig. 2

Table 2

Strengths, No. of Bends, Depths of Impressions for Steel and Bergmetall

	STEEL				BERGMETALL			
Thickness of Plate	Strgth. kg/mm²	Elongation %	No. Bends	Depths of impression mm	Strgth. kg/mm²	Elongation %	No. Bends	Depths of impression mm
0.5	36	10.5	76	7.2	47	10.5	33	5.5
1	34	15.3	26	95	47	11.0	3	4.2
2	39	12.0	10	10.9	45	11.0	Fractured at 90°	3.4
3	40	17.7	6	13	48	14.1	Fractured at 60°	3.0
4					48	9.7	Fractured at 45°	2.8

Although the strength values of the steel plates are less than those of the duralumin plates, nevertheless one can compare the figures as to number of bends and depths of impression without correction, since it is possible to obtain steel plate with higher strength which also posseses great ductility.

The number of bends (see Fig. 5) for both metals decreases with increased thickness. For steel, however, they lie considerably higher than for duralumin. The difference is least plates under .5 mm. in thickness. For thicker plates of duralumin the number of bends decreases very rapidly. A plate 2 mm. thick breaks over a 90° bend; a plate 4 mm. thick over a 45° bend. From these results duralumin might be referred to as "cold short" for thicknesses greater than 1 mm. This property makes it unsuitable for highly stressed parts which must at the same time withstand vibrations. This is of prime importance in connection with the bent lug plates which are ordinarily used in aircraft for taking wire terminals. In these lugs vibrations undoubtedly occur during flight which would reduce the strength of the duralumin and might cause sudden fracture.

Exactly how vibrations influence the modulus of elasticity has not yet been determined, although experiments along this line are already under way.

A comparison of the depth of impression of steel and duralumin shows (see Fig. 6) that for steel the depth of impression increases with the thickness of the material while for duralumin it decreases. As a result of a peculiarity of the testing machine used the greatest stress occurred at a point which was from 5 mm. to 6 mm. from the vertex of the depression. In this locality the material began to flow before cracking. It is obvious that thick plates of ductile material may be stretched more easily on the upper surfaces and consequently deeper impressions obtained than with thin plates, since for thick plates more material can flow before fracture occurs. A similar course of reasoning can be used to explain the decrease of depth of impression with increasing thickness of plate in the case of material of less ductility. On the upper surface of the test pieces there occur high tensile stresses at the point above mentioned, which increase with the strength of the plate. As the material flows only to a small degree, cracks very soon appear and extend into the interior. The process described can be followed on the sections of a steel

Ericsons Test Apporotus

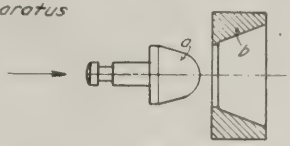


Fig 4

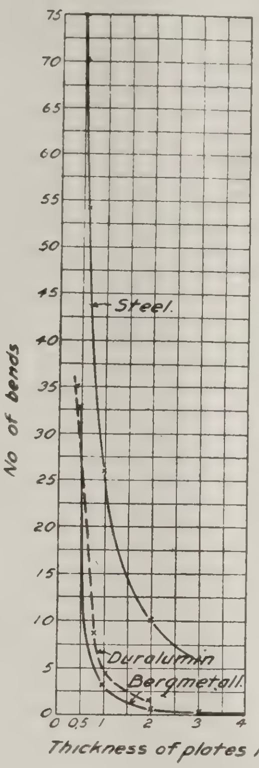


Fig 5

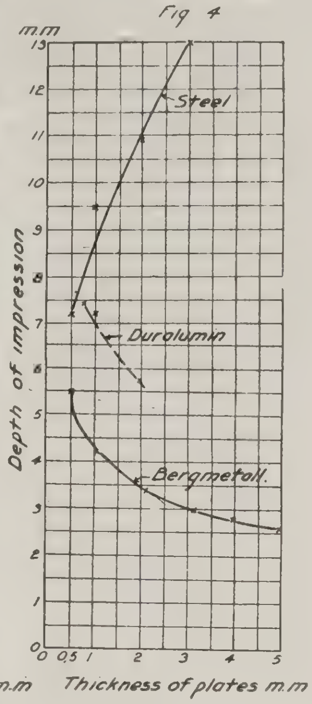


Fig 6

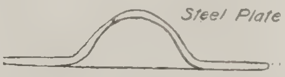


Fig. 7.

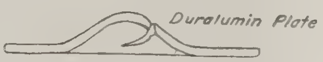


Fig. 8.

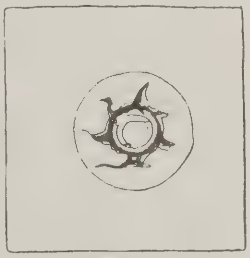


Fig. 9

Outside Fracture of Duralumin Plate.

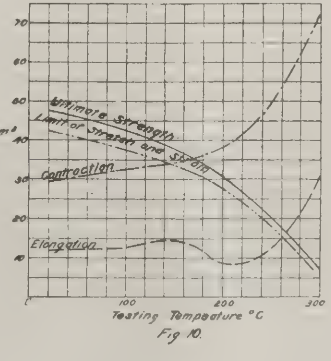


Fig. 10.

plate of about 40 kgs. per sq. mm. strength and a duralumin plate, Fig. 8. The flow before fracture of the steel plate is plainly recognizable while the duralumin plate shows hardly a sign of it.

Fig. 9 is a photograph of a test sample of strong duralumin plate after fracture in which the material suddenly split in all directions.

For flanging and pressing tempered duralumin is consequently suitable only in the thin gauges.

Influence of Heat and Cold

Heat has an important influence on the strength of duralumin. According to the results obtained in tests by the Central Bureau for Scientific Investigation, Neubabelsberg, when heated the strength decreases 10% for an increase in temperature of 100° and about 20% for an increase of 150° (see Fig. 10). The loss in strength increases with the increase of temperature. The elongation increases on first heating to a hardly appreciable extent, while between 150° and 200° it decreases. At 250° the elongation becomes the same as at room temperature. With further heating the elongation increases with increasing temperature. Consequently wherever duralumin is exposed to heat the possible decrease of strength must always be considered.

As opposed to the foregoing the influence of cooling on the strength properties is less unfavorable. The Central Bureau for Scientific Investigation has made tests on this also (see Table 3).

Table 3

Influence of Cold on the Strength of Duralumin

Testing Temperature	The bar was tested in	Limit of stretch & strain	Tensile tests Ult. strength kg/mm²	Elongation %	Impact test Work of breaking kg/mm²
+20°	Air	24.0	42.5	21.9	2.6
0	Snow	23.6	43.0	21.8	2.6
—20	Mixture of snow and table salt	24.0	43.7	23.1	2.7
—40	Mixture of snow and calcium chloride	24.0	44.0	22.1	2.7
—80	C O$_2$ snow	25.2	44.4	22.7	2.7
—190	Liquid air	32.3	53.7	28.7	2.6
+20	Air	23.0	42.3	23.3	2.6

The strength and elongation increase somewhat with the decrease in temperature. The work represented by the blow in the impact tests is not decreased when material is affected by cold so that one can safely assume that the cold encountered in flight has no unfavorable influence on duralumin.

Experiments on the influence of weathering on the strength of duralumin, which have been carried on by the Durener-Metallwerke for 3 years have shown that no observable decrease in the strength properties can be noticed (see Table 4).

Table 4

Effect of Weathering on the Strength of Duralumin

Testing Data Alloy 681a	DEC. 1909		NOV. 1910		NOV. 1911		DEC. 1912	
	Strgth. kg/mm²	Elongation %	Strgth. kg/mm²	Elongation %	Strgth. kg/mm²	Elongation %	Strgth. kg/mm²	Elongation %
Round Bar	41.7	20	42.2	21	42	21.1	42.9	18.3
Bar (thick)	39.1	20	38.7	19.6	39.3	18.9	40	20
Bar (thin)	42.0	20	39.1	18.0	39.3	18	42.3	16.5
Wire (thick)	48.0	20.1	45	20.1	44.3	19.7	44.5	19.8
Wire (thin)	46.3	20	44	19.6	42.5	18.7	43.2	18.5

The Durener-Metallwerke have also carried on for about a year, experiments on the influence of the electrolytic effect from junctions of duralumin with iron or steel. These were made by riveting duralumin bars to iron plates and then placing them in artificial sea water. There resulted only an insignificant destruction of the iron and a reduction in weight of the bars of about .23%, so that no considerations exist against the use of duralumin and iron junctions in aircraft.

Summary

Duralumin has a strength of 35 to 40 kgs. per sq. mm. and an elongation of 10 to 15%. The stretching strain limit lies very high, about 28 to 32 kgs. per sq. meter. The modulus of elasticity is about 600,000 to 700,000 kgs. per sq. cm. It is very brittle especially in thicknesses above 1 mm. and consequently sensitive to bending to and fro (alternating).

Bent Plate Fittings, with bent lugs which must resist vibration are best not made out of duralumin but of sheet steel. For stressed parts which while in flight are exposed to an increase in temperature of more than 100° C. the use of duralumin is objectionable unless a correspondingly smaller strength value is used in computations. Cold has no harmful influence on duralumin. The joint between iron and steel and duralumin can be made without electrolytic action occurring. Pieces, which for better working must be heated, must be in all cases re-tempered after completion.

A NEW HIGH-LIFT WING

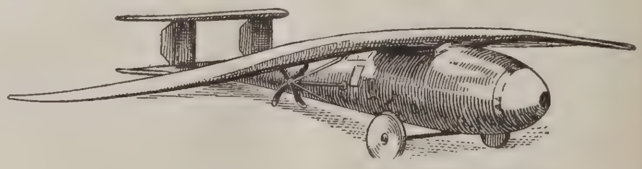
THE British aeronautic trade press give prominence to description of a new aeroplane wing form about to be introduced by the Commercial Aeroplane Wing Syndicate, Ltd., of London. In a recent issue *Flight* states that this wing, of which the aerodynamic data are herewith given, is the outcome of many years of experiment and research, and although in its present form the wing marks a great improvement on the ordinary aerofoil for load carrying at moderate speeds, it does not, in the opinion of the inventors, represent the maximum attainable.

The accompanying sketch shows a model wing of this series, from which some idea of the shape of the wing may be formed. The chief characteristics are the straight trailing edge, the negative dihedral leading edge, the deep camber, and the wash-out in chord camber and incidence towards the tip. In addition to the scale model wind tunnel tests, full scale experiments have been made for some time by the technical staff of the Blackburn Aeroplane & Motor Co. in order to determine the agreement between model and full scale work. These trials are still in progress, and very satisfactory results are being obtained.

A reference to the accompanying table will show that not only is the maximum lift coefficient unusually high, but the maximum L/D and the lift coefficient corresponding to maximum L/D are also extremely good. The maximum lift coefficient is .827 and occurs at an angle of incidence of 15°. As the maximum lift coefficient of the ordinary wing is somewhere between .5 and .6 it will be seen that, for the same landing speed, the wing area can be reduced to about three-fourths that necessary with the ordinary wing. This is not the only, nor perhaps the greatest, advantage of the Alula wing, as it is called by the designers. The maximum L/D (to which scale correction still has to be added) is as high as 22.9, which compares favorably with the orthodox wing, and the lift coefficient corresponding to this maximum L/D is .566, or as high as the maximum lift coefficient of the average wing. This, it will be seen, makes for economy of flight, especially in machines carrying a high load at moderate speeds.

It is not the intention of the Commercial Aeroplane Wing Syndicate, Ltd., to enter the constructing trade as competitors, but rather to issue licenses for the use of Alula wings by aircraft manufacturing firms, and enquiries from *bona fide* constructors are invited. The wing, it might be added, can be used in machines of orthodox design if desired.

Designs have been produced by Mr. Harris Booth, of the Blackburn Co. for a cargo machine to carry four tons. This is known as the "Pelican 4 Ton Lorry." This is a colossal cantilever monoplane designed for two 460 h.p. Napier engines. Its cruising speed is 72 m.p.h., its top speed 96 m.p.h., and its landing speed 55 m.p.h. Its total load is 24,100 lb. its wing loading is 12.9 lb. per sq. ft., its useful load is 4 tons, with fuel for the London-Paris journey, and the cost of operation will be about six cents per lb. of cargo for the London-Paris journey.



Illustrative sketch of the new Alula High-Lift Wing

THE STRUCTURAL ANALYSIS AND DESIGN OF THE AEROPLANE

By B. C. BOULTON

In Charge of Stress Analysis and Structural Design, McCook Field

(*Concluded from page 744*)

The Theorem of Three Moments

THE derivation of the three moment equation from the theory of the elastic curve will not be taken up here. In the form in which it is used for uniformly distributed loads on a beam, with its supports either all on the same level or lying in the same straight line, the equation is as follows:

$$M_1L_1 + 2M_2\,(L_1+L_2) + M_3L_2 = + \frac{w_1L_1^3}{4} + \frac{w_2L_2^3}{4}$$

The determination of the sign of the shears in the solution of the three moment equation is apt to cause more confusion than any other part of the problem. A definite rule can be given, however, that will always hold, whatever the type of loading. If the portion of the beam between a reaction point and a section at which the shear is to be determined, tends to slide up by the part of the beam on the other side of the section, the shear is positive. If the tendency to slide is the reverse, the shear is negative. Fig. 18 is a graphical representation of this law. When first calculating the shears from the bending moments at the reaction points by the equation, $M_2 = M_1 + S_{+1}\,X + \Sigma F \cdot a$, the sign of the shear term should always be written plus. If the solution of the equation gives the shear a positive sign, the shear is positive. But if the solution results in a negative sign, the shear is negative, and must therefore be used with a minus sign in any further computations. It will be observed that a positive shear always tends to produce a positive moment, or one that causes compression in the top of a beam, while a negative shear tends to produce a negative moment. Attention should again be called to the fact that downward loads are negative, upward loads positive. In the right members of the general equation of three moments, both terms have a positive sign, but in the computations which follow these terms become negative because w_1 and w_2 are negative.

For purposes of plotting, the law of signs given above must be slightly modified. If that portion of the beam to the left of a section tends to slide up by the portion to the right of the section, the shear is positive. When the tendency to slide is the reverse, the shear is negative. This rule is illustrated by the part of Fig. 18 to the right of the reaction point.

The solution for a typical case (See Fig. 22) is given below:

Moments

(1) $M_1 = \dfrac{-10 \times 25^2}{2} = -3{,}125$ in. lbs. and $M_4 = \dfrac{-10 \times 20^2}{2} =$ $-2{,}000$ in. lbs.

(2) $-3{,}125 \times 100 + 2M_2\,(100 + 50) + M_3 \times 50 = -\dfrac{10}{4}\,(100^3 + 50^3)$

(3) $M_2 \times 300 + M_3 \times 50 = -2{,}500{,}000.$

(4) $M_2 \times 50 + 2M_3\,(50 + 110) - 2{,}000 \times 80 = -\dfrac{10}{4}\,(50^3 + 110^3)$

(5) $M_2 \times 50 + M_3 \times 320 = -3{,}480{,}000.$

Solve equations (3) and (5) simultaneously
$M_2 = -6{,}695$ in. lbs.; $M_3 = -9{,}835$ in. lbs.

Shears and Reactions

(6) $\Sigma V = -25 \times 10 + S_{-1} = O;\ S_{-1} = +250$ lbs.

(7) $-6{,}695 = -3{,}125 + 100 \times S_{+1} - \dfrac{100^2 \times 10}{2}$

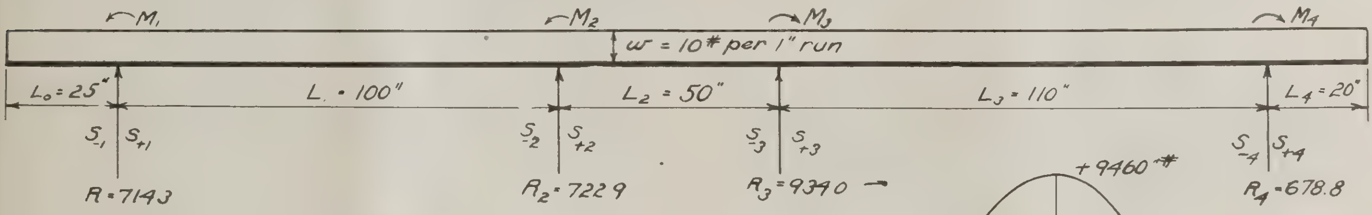


Figure 22. Continuous beam with loads and reactions

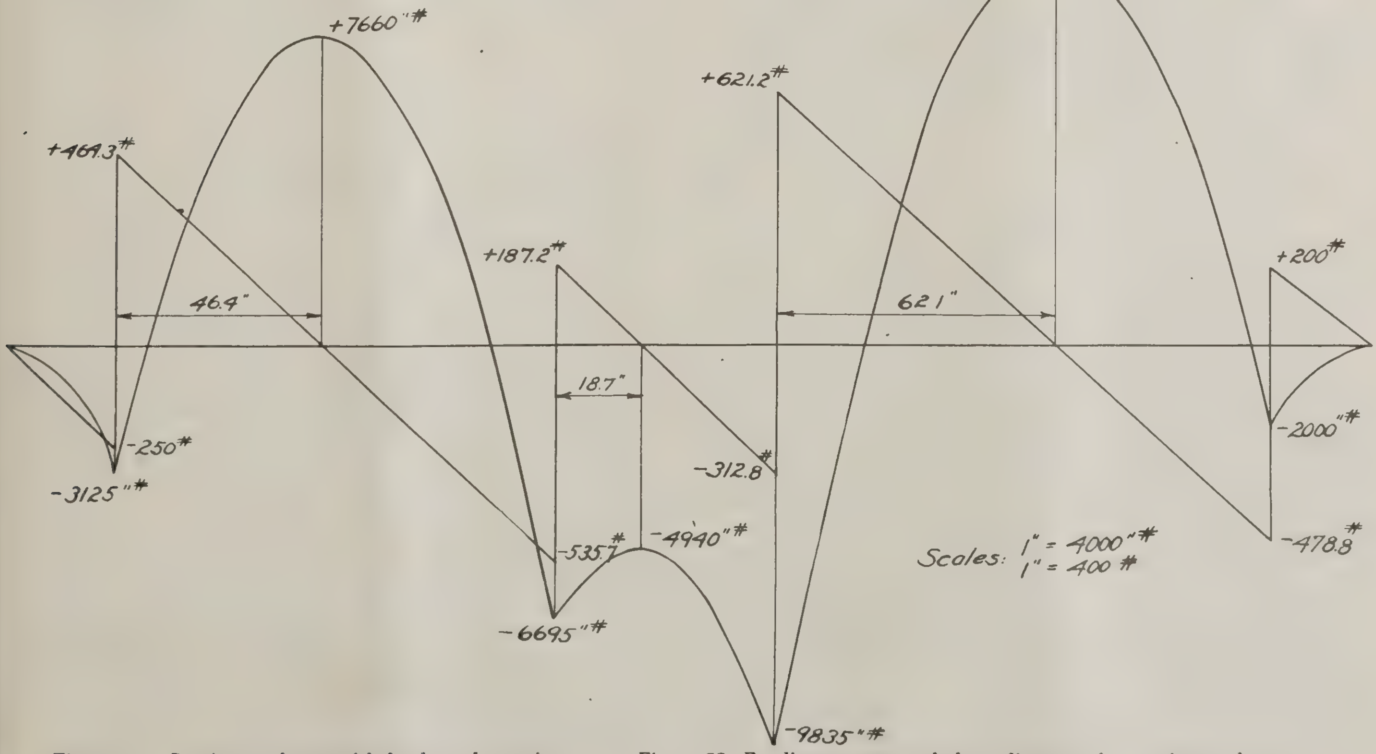


Figure 23. Bending moment and shear diagrams for continuous beam

(8) $S_{+1} = \left(\frac{-6{,}695 + 3{,}125}{100}\right) + \frac{100^2 \times 10}{2 \times 100} = +\ 464.3$ lbs.

(9) $R_1 = S_{-1} + S_{+1} = 714.3$ lbs.

(10) $\Sigma V = -10 \times 100 + 464.3 + S_{-2} = O;\ S_{-2} = +\ 535.7$ lbs.

(11) $-\ 9{,}835 = -6{,}695 + 50\ S_{+2} - \frac{50^2 \times 10}{2}$

(12) $S_{+2} = \left(\frac{-9{,}835 + 6{,}695}{50}\right) + \frac{50^2 \times 10}{2 \times 50} = +\ 187.2$ lbs.

(13) $R_2 = S_{-2} + S_{+3} = 722.9$ lbs.

(14) $\Sigma V = -50 \times 10 + 187.2 + S_{-3} = O;\ S_{-3} = +312.8$ lbs.

(15) $-2{,}000 = -9{,}835 + 110\ S_{+3} - \frac{110^2 \times 10}{2}$

(16) $S_{+3} = \left(\frac{-2{,}000 + 9{,}835}{110}\right) + \frac{110^2 \times 10}{2 \times 110} = +\ 621.2$ lbs.

(17) $R_3 = S_{-3} + S_{+3} = 934.0$ lbs.

(18) $\Sigma V = -110 \times 10 + 621.2 + S_{-4} = O;\ S_{-4} = +\ 478.8$ lbs.

(19) $S_{+4} = +\ 20 \times 10 = +\ 200$ lbs.

(20) $R_4 = S_{-4} + S_{+4} = 678.8$ lbs.

Check (21) Total load $= 10\ (25 + 100 + 50 + 110 + 20) = R_1 + R_2 + R_3 + R_4 = 3{,}050$ lbs.

Points of Zero Shear

Span 1-2 $X = \frac{S_{+1}}{w} = \frac{464.3}{10} = 46.4''$ from R_1.

Span 2-3 $X = \frac{187.2}{10} = 18.7''$ from R_2.

Span 3-4 $X = \frac{621.3}{10} = 62.1''$ from R_3.

Center Moments

(22) $M_{1-2} = -\ 3125 - \frac{46.4^2 \times 10}{2} + 46.4 \times 464.3 = +\ 7660$ in. lbs.

(23) $M_{2-3} = -\ 6695 - \frac{18.7^2 \times 10}{2} + 187.2 \times 18.7 = -\ 4940$ in. lbs.

(24) $M_{3-4} = -\ 9835 - \frac{62.1^2 \times 10}{2} + 621.2 \times 62.1 = +\ 9460$ in. lbs.

The methods of solution used above are but applications of the principles previously discussed, especially the relationship between the moments at two sections of a beam, the shear at one of the sections, and the loads between the sections. In determining the maximum moments in a span, the point of zero shear at which, as has been explained, this moment occurs, was first calculated. As in the present example, there may be two or more unknown moments over the supports, making it necessary to write the three-moment formula as many times as there are unknown moments, and to solve the resulting equations simultaneously. It is first applied to the first and second interior spans at the left end of the beam, then to the second and third, and so on till the last interior span at the right end of the beam is reached. In the general equation M_1 is always the moment at the left end of the left of the two spans being considered, M_2 that between the spans, and M_3 that at the right end of the right span.

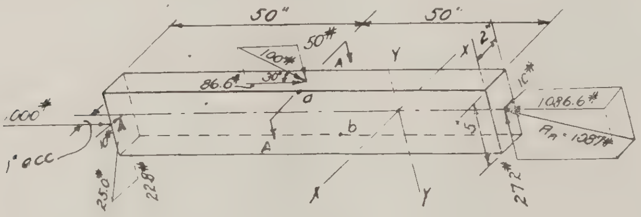


Fig. 24

Combined Bending and Compression

When the forces acting on a beam do not conform in direction and point of application to the conditions stated at the beginning of the discussions of the beam theory, the formula for simple beam action, $f = \frac{My}{I}$, must be supplemented. In Fig. 24 none of the loads are both perpendicular to the axis of the beam and in a vertical plane passing through the neutral axis. The first step is to resolve all forces which are not either parallel or perpendicular to this axis into two, or if necessary, three components which are either parallel or perpendicular to it. Those components or forces which are at right angles to the neutral axis of the beam produce bending about that axis of the cross-section to which they are perpendicular; those components of forces parallel to the neutral axis cause axial compression in the beam, and if they are not applied at the center of gravity of the section they also produce bending about one or both axes of the cross-section, depending on the nature of their eccentricities. The calculation of the moments and reactions for the beam and loads in Fig. 24 will not be given. It should be noted that the right reaction has three components and the left, two components. The eccentricity of the 1,000 lb. load causes a moment about the Y-Y axis The stresses on section A-A are given below:

$M_{x-x} = 1358$ in. lbs.

$M_{y-y} = 500$ in. lbs.

$P = 1087$ lbs.

$f_{x-x} = \frac{1358 \times 2.5}{20.8} = 163.0.$

$f_{y-y} = \frac{500 \times 1.0}{3.33} = 150.0.$

$P/A = \frac{1087}{10} = 108.7.$

Maximum Compressive Stress = 421.7 lbs. per sq. in.

Maximum Tensile Stress = 313.0 — 108.7 = 204.3 lbs. per sq. in.

At point a the maximum compressive stress occurs and at point b the maximum tensile stress.

The above procedure is satisfactory when the beam is relatively short, so that the deflection of the beam is small. In the case of long, slender beams carrying a large axial load, additional moments are caused by the deflection of the beam, which may be considered as a laterally loaded column. This case will be treated in a later article on wing spars.

Column Formulas

When a column is straight, and the only load imposed upon it is axial and is applied at the center of gravity of the column, then the stress equals P/A, where P is the load and A the cross-sectional area. For very short columns the maximum value of P/A will closely equal the stress at the yield point of the material, but for long columns the P/A at which failure will occur is much less than this value. The purpose of column formulas is to determine the maximum allowable P/A. In practically all formulas the reduction in the ultimate stress for "column action" is a function of the ratio of the length of the column to its least radius of gyration.

For columns having a high value of L/ρ, the maximum P/A is given very closely by Euler's formula, $P/A = \frac{\mu E}{(L/\rho)^2}$ or

$$P = \frac{\mu E I}{L^2}$$

E = Modulus of elasticity of material.

L = Length of column.

ρ = Least radius of gyration of column.

I = Least moment of inertia of column.

μ = A constant depending on the degree of fixity of the ends of the column.

$\mu = \pi^2$ for round ends.

$= \frac{\pi^2}{4}$ for one end free and one end fixed.

$= 2.05\ \pi^2$ for one round and one end fixed.

$= 4\ \pi^2$ for fixed ends.

The lower value of L/ρ to which this formula applies is given in the discussion below.

The column formula that agrees best with test data on columns, whose L/ρ is less than the lower limit to which the Euler formula is applicable, is J. B. Johnston's parabolic formula, $P/A = C - c\ (L/\rho)^2$.

C = Yield point of material.

$c = C^2/4kE$.

k = 10 for round ends.

k = 16 for hinged ends.

k = 25 for flat ends.

For a value of $L/\rho = 0$, P/A equals the stress at the yield point, which for columns, coincides with the ultimate strength. As shown in Fig. 25, which is the curve for mild steel, the parabola is tangent to the Euler curve at approximately the point where columns cease to follow the Euler law. The abscissa of this point of tangency is given by the expression $L/\rho = \sqrt{2kE/C}$; the ordinate of this point equals C/2.

For mild steel, the assumption that the ultimate strength of the column equals the yield point is perhaps somewhat severe. The use of 40,000 instead of 36,000 for the formula in Fig. 25 would give less conservative and yet very reasonable values. One of the important features of this formula is that the c is a function of both the yield point and the modulus of elasticity. This is especially valuable where experiment has not determined the column strength of the material, as in the case of high strength, alloy steels and duraluminum.

Wood and Steel in Combination

There are occasional cases of wood and steel in combination when it is desirable to determine the proportion of the stress which each material carries.

E_w = modulus of elasticity of wood.
E_s = modulus of elasticity of steel.
A_w = area of wood.
A_s = area of steel.
I_w = moment of inertia of wood.
I_s = moment of inertia of steel.

Case I. Beams subjected to bending.

W = total load = $W_w + W_s$.
W_w = load carried by wood.
W_s = load carried by steel.

$$W_w = \frac{W}{\left(1 + \frac{E_s I_s}{E_w I_w}\right)}; \quad W_s = \frac{W}{\left(1 + \frac{E_w I_w}{E_s I_s}\right)}$$

Case II. Short Columns.

P = total axial load.
P_w = load carried by wood.
P_s = load carried by steel.

$$P_w = \frac{P}{\left(1 + \frac{E_s A_s}{E_w A_w}\right)}; \quad P_s = \frac{P}{\left(1 + \frac{E_w A_w}{E_s A_s}\right)}$$

Case III. Euler Columns.

$$\rho \text{ of composite column} = \sqrt{\frac{E_w I_w + E_s I_s}{E_w A_w + E_s A_s}}$$

Total $EI = (E_w I_w + E_s I_s)$.

Torsion, and Combined Torsion and Bending

In control systems and surfaces, tubes are frequently subjected to torsion. The stresses due to torsion, and the torional angle or angle of twist for round tubes are given by the following formulas:

f_s = torsional unite stress.
J = polar moment of inertia of section.
M = twisting moment.
r = radius of the tube.
ϕ = torsional angle in radians (this angle in degrees = $57.3 \times \phi$).
L = length of tube for which torsional angle is desired.
E_s = shearing modulus of elasticity.

$$f_s = \frac{M \cdot r}{J} \text{ and } \phi = \frac{M \cdot L}{E_s \cdot J}$$

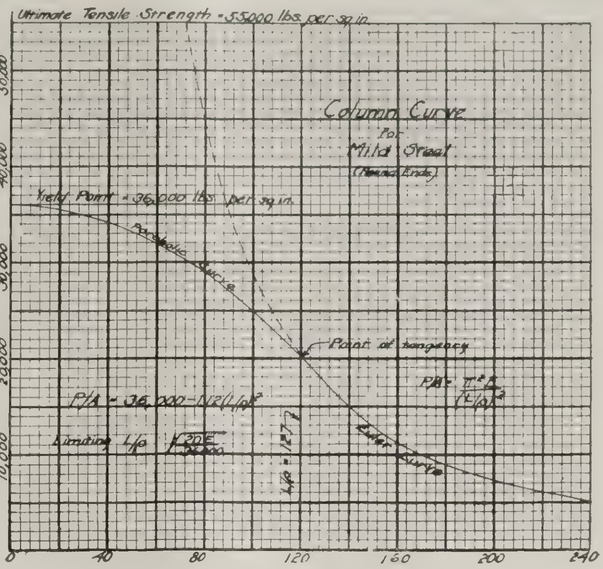


Fig. 25

These formulas apply only to solid or hollow circular sections The polar movement of inertia equals the sum of the moments of inertia of the section about any two axes at right angles to each other, or for circular sections, twice the ordinary moment of inertia.

Frequently a member is subjected to both bending and torsional stresses. These two kinds of stresses may be combined as follows:

f_b = the bending stress computed from $\frac{My}{I}$

f_s = the torsional stress computed from $\frac{Mr}{J}$

$$F_c = \frac{f_b}{2} + \sqrt{f_s^2 + f_b^2/4} = \text{maximum tensile or compressive stress.}$$

$$F_s = \sqrt{f_s^2 + f_b^2/4} = \text{maximum shearing stress.}$$

Units

In using all the formulas given in this chapter, the greatest care must be taken to have the units consistent. It is best to use the same units in all computations. A large part of the trouble with units is caused by the use of feet or foot units in place of inches and inch units.

NOTE:—Permission to publish the remaining articles of this series is withheld by the U. S. Government. The entire series, however, is being issued in book form by the U. S. Government, and will be available in all large libraries after September 1, 1920.

BOOK REVIEWS

BRITISH AIRSHIPS, PAST, PRESENT AND FUTURE: By *George Whale* (late Major, R. A. F.). With twenty-four illustrations.

This book should make a very wide appeal, as the public has had practically no authentic information as to the progress made in this branch since 1914.

The volume treats of early airships and their development to the present day; British airships built by private firms; British army airships; early days of the naval airship section; naval airships; the non-rigids; the rigids; the work of the airship in the world war; the future of airships.

This volume can be obtained at the Aeronautic Library, Inc., 299 Madison Avenue, New York City, N. Y. Price $2.20 postpaid.

THE TRIUMPH OF THE NC's: By the man who made them and those who flew them.

The full story, from the making of the first plane to the final achievement. Commander C. C. Westervelt tells how they were built, Commander A. C. Read how the NC-4, "the lame duck, won out," Commander H. C. Richardson the thrilling story of how the crippled NC-3 made port.

This volume can be obtained at the Aeronautic Library, Inc., 299 Madison Avenue, New York City, N. Y. Price $3.30 postpaid.

"LUCK ON THE WING": By *Major Elmer Haslett.*

This is a volume of thirteen stories based on the author's actual experiences as a sky spy in the U. S. Army Air Service in France. Awarded the Distinguished Service Cross and the *Croix de Guerre Francaise*, and twice mentioned by General Pershing for conspicuous bravery and meritorious service, the author has encountered many forms of adventure and danger, and in narrating his experiences he attempts no elaborate literary style, but gives his readers a graphic, straightforward narrative which brings home all the more vividly the daring spirit and heroic achievements of the narrator.

This book can be purchased at the Aeronautic Library, Inc., 299 Madison Avenue, New York City, N. Y. Price $3.30 postpaid.

AIRCRAFT, AIRSHIPS, AEROPLANES, ETC.: By *T. W. Corbin.*

Illustrated with twelve full-page halftone plates and twenty-one diagrams. This book is not intended for the aviator, but seeks to explain simply and clearly a few of those facts about Aircraft which are of interest to that very important class—the interested public. *Contents: The Present State of the Flying Art, How Man Can Fly, How an Aeroplane Keeps Its Pose, British Aeroplanes (Biplanes), British Monoplanes, Some Famous Machines, Flying in Gusty Weather, Airships and Balloons, Notable Airships, Aerial Engines, Simple Experiments.*

This book can be purchased at the Aeronautic Library, Inc., 299 Madison Avenue, New York City, N. Y. Price 90c postpaid.

REPORT OF LATEST CONGRESSIONAL INVESTIGATION OF BILLION DOLLAR AIRCRAFT EXPENDITURES

(*Continued from page* 752)

Director John D. Ryan

Mr. Ryan has been given space in this report commensurate with his responsibilities as aricraft director. He was appointed by Secretary Baker as director and in addition thereto an Assistant Secretary of War just prior to his European trip. His business associate and co-worker in private life, Mr. Potter, was Mr. Ryan's predecessor in office and later his assistant director. Both were copper magnates, without aircraft knowledge, given vast responsibilities at a time when the country imperatively needed wide knowledge and large experience in public service.

Successful in promoting private ends, Mr. Ryan was expected to unlearn singleness of personal interest and to direct his future energies toward a carefully considered aircraft program. With public honors unexpectedly thrust upon him; an unforunate victim of numerous banquets and other official functions; selected as the companion of his immediate superior, Mr. Baker, for a lengthy European trip at a time when imperative duties commanded his attention here; hurriedly basing all prospects of American aircraft success during his presence, or absence, upon the production of an awkward and dangerous type of aeroplane, Mr. Ryan did not rise above his advisers who had conspicuously failed to meet the situation.

In a remarkable chain of circumstances surrounding the location and building of the Siems-Carey $4,000,000 "logging" road, and in connection with the $23,000,000 spruce contract, Mr. Ryan's activities have been disclosed. His disclaimer of any purpose to advance his own interests or those of Mr. Carey, one of his business friends, or of the Milwaukee road, of which he was a high official, have been presented to your committee. If Mr. Ryan's statement of disinterestedness is true, he has been most unfortunate in handling a public matter that, in the judgment of your committee, covered a flimsy effort to promote large private business interests and was accompanied by blundering explanations from beginning to end.

We have not assumed to determine motives, but have presented facts developed at the hearings in connection with the actions of responsible public officials, and these facts are offered without further comment.

The Milwaukee Road

Officials of the Milwaukee road testified before our committee as to their disinterestedness in the Siems-Carey operations. It is hard to understand why the road was not deeply concerned over matters herein described, excepting where operations were useless as well as wasteful. It is, however, possible that an apparent effort to shape the policy of the road was not approved by the responsible officials. With due allowance for the high standing and evident fairness of the officials mentioned, the hearings present many matters that we believe fully justify the conclusion reached. That this conclusion is unavoidable appears from the conservative findings of Gen. Frank McIntyre, based on the limited information carried in the Ray report. Gen. McIntyre pointedly says to Secretary Baker:

> A possible congressional investigation with reference to the location of this railroad might prove embarrassing to the War Department, as the plain insinuation would be that the decision was influenced by the large financial interests concerned.

Secretary of War Baker

Secretary Baker is properly chargeable with any success or failure of America's aircraft program. His selection at a critical time for the important department of governmental war activities by President Wilson, promised official capacity.

Whether Mr. Baker was equal to the demands of war must be determined from the record. Men accepting public obligations are measured by that standard, and your committee has presented a brief review of aircraft activities.

Prior to our entry into the war the world had been on fire for two and one-half years. Aircraft had become a recognized important arm of the military service. It was a time when any responsible official, primarily charged with public safety and with war preparation, should have provided the country with the best available war equipment, or should have placed definite plans before Congress to that end. It was a time when a man of capacity and force should have been selected and placed in charge of aircraft, prepared for any reasonable war emergency.

As a Government we were permitted to drift without rudder or sail in our aircraft program from the time Secretary Baker assumed charge of the War Department down to end of the war.

Mr. Baker's appointment of Gen. Squier, in charge of aviation, and his agreement with the foolhardy April, 1917, aviation program (p. 23); his appointment of Col. Deeds and unprecedented act in preventing Deeds' court-martial, which was recommended by Judge Hughes (p. 2655); his appointment of Mr. Potter as aircraft director, a man without knowledge of aviation (p. 65) and interested in enormous copper contracts with the Government; his appointment of Mr. Ryan as aircraft director, also without knowledge of aviation (p. 66) and president of the Anaconda Copper Co. that, through the United Metals Selling Co., controlled all copper contracts made with the Government; his appointment of Col. Disque, who was equally without knowledge of the business, and his directions to limit to eight hours per day all work, civilian or military, in Oregon and Washington during times of war and to pay the soldiers the prevailing civilian wages; his approval before the Thomas Senate committee of Mr. Ryan's determination to continue all efforts in the production of the extremely dangerous DH-4 (p. 42); his extended European trip in company with Aircraft Director Ryan in the midst of America's aircraft failure and during the most critical hours of national defense activities—these were matters presented to your committee in the hearings and speak for themselves.

Wasteful Methods

We feel that it is our duty to call the attention of the House and the country to the large amount of spruce going to waste in Washington and Oregon as a result of the riving and cutting operations of the Spruce Production Corporation in the forests of those States. Newspaper publishers throughout the United States are so hard pressed to get sufficient newsprint paper to meet their requirements that some steps should be taken to utilize this available spruce. Trees have been cut from 6 to 8 feet and more above the surface of the ground. The reason given was that the butt of the tree was not straight grained and unsuitable for aircraft lumber. When we consider that the trees averaged several feet in diameter, it becomes apparent how great the wastage has been. Evidence taken at the hearings shows that the spruce trees cut in France for aircraft purposes were cut as near to the surface of the ground as the saw could be operated. The trees thus cut were planted by the thrifty French several centuries ago. Besides, riving operations were extremely wasteful of the spruce timber. In this connection we do not speak in any spirit of criticism, but because we feel that enough spruce is going to waste in those forests to furnish sufficient newsprint paper to meet the requirements of American newspapers for some time to come.

It will be apparent to any fair-minded person who will carefully read the evidence that the stake being played for, in the abortive attempt to produce spruce lumber in Washington and Oregon, was for the control of the lumber interests in the Northwest after the war. In exposing this scheme the patriotic loggers and lumbermen on the coast and the Providence Journal have rendered a great public service.

It should be a perpetual warning to men holding high official positions that they must not use their official power, particularly in time of war, to advance commercial interests at governmental expense.

(*To be continued*)

NAVAL and MILITARY AERONAUTICS

Army Alaska Planes at Prince George, B. C.

Prince George, B. C.—Three of the four United States army aeroplanes, which are blazing an aerial trail from Mineola, N. Y., to Nome, Alaska, arrived from Jasper at Prince George, B. C.

After taking off from Edmonton, Alberta, Canada, on August 2nd it was found that Captain Street's machine was on fire and he was compelled to return to Edmonton. He continued the flight the following day and joined the other machines at Prince George, where his machine was so badly damaged in alighting, during a storm, that three days were required to repair it. This was after he had been compelled to stop at Jasper because of motor trouble. The next leg of the flight is to Hazelton, B. C.

Navy Gets All-Metal Seaplane

One of the three all-metal seaplanes of the JL-6 monoplane type recently purchased by the Navy Department, arrived at the naval air station, Anacostia, D. C., on July 28th, and is now undergoing tests for speed and carrying capacity. This plane flew from New York to Anacostia over the land for the last thirty miles of the journey. Fitted with two metal floats, its fuselage high out of the water, and with huge single wings projecting without support of struts or wires, this hydroaeroplane is arousing much interest in flying circles, and it is said that this type of plane bids fair to revolutionize the design and construction of naval aircraft. The Navy bought three of these machines for testing purposes, and they are identical with the JL-6 squadron now in flight from New York to San Francisco and return, with the exception that the floats are substituted for the field landing gear.

Aerological Equipment for Pearl Harbor

A complete set of aerological equipment for a naval air detachment is being assembled at the naval air craft factory to be shipped to the naval air station at Pearl Harbor, Hawaii.

Captain Williams Acting Aviation Chief

Capt. Robert E. Williams, U. S. M. C., who made an enviable record with the Northern Bombing Group in the war, is now assistant to Major A. A. Cunningham in the Office of Marine Aviation at headquarters in Washington. Captain Williams is acting Chief of Aviation in the absence of Major Cunningham.

To Fly From Panama Canal to Washington, D. C.

The War Department has authorized an aeroplane flight from the Panama Canal Zone to Washington, the flight to be made in a De Haviland 4-B plane. First Lieutenant Charles B. Austin will pilot the machine and will be alone. The distance to be covered is 2,399 miles and Lieutenant Austin hopes to start on his flight early next month.

Lieutenant Austin has drawn plans for remodeling the plane so that it will have a capacity of 200 gallons of gasoline, sufficient to reach Jamaica, the first leg of the journey. On this stretch of 650 miles he will have to fly directly over the Caribbean Sea, with no landing place from the time he takes off until he reaches Jamaica.

His route then will be from Jamaica to Havana, Cuba, 450 miles; to the Army Flying Field, at Arcadia, Fla., 250 miles; to Southern Field (Americus, Ga.), 380 miles; to the artillery fire center, Fayetteville, N. C., 350 miles; to Langley Field, Va., 200 miles, and to Washington, 159 miles.

Should the weather then be unfavorable the flight will not be made until the next rainy season, it being impracticable to attempt it in the dry season because of adverse winds.

Great Lakes Has Large Aviation School

Nearly 100 men are being graduated every three weeks at Great Lakes Naval Training Station from what naval officers describe as the biggest trade school in the world.

The school is devoted exclusively to the training of aviation mechanics and at the present time 3,225 students are taking the courses, which range in length from sixteen to 36 weeks.

More than 1,000 men have graduated since the school was established slightly more than a year ago and another 1,000 will complete their work by November. Lieutenant Commander E. E. Wilson, commandant at the school, says all of the 6,000 men provided for in the naval air force will be graduates of the school within another year.

The cost of turning out the first 1,000 graduates was $7,000, making the average cost of producing trained aerial mechanics $7 each. The low cost was due to the fact that the students produce nothing in their studies to be wasted. Instead of making the frequently useless examples they work on parts actually needed for repairs and construction of new aeroplanes.

A number of planes ranging from small land flyers to huge seaplanes, only a step smaller than the famous "N-C" type, have been completed.

Lieutenant Commander Wilson started the school from the bottom a year ago. As the first step the navy officer wrote all the text books to be used.

No flying is done but the best men from each class are eligible later to attend a school for enlisted pilots. The 3,225 students now here include 440 marines.

Personal Par

C. F. Taylor has accepted a position in the engineering department of the H. H. Franklin Manufacturing Company, Syracuse, N. Y. He was formerly assistant engineer in the powerplants laboratory of the Air Service at McCook Field, Dayton, Ohio.

The Blackburn "Kangaroo" of the type to be used in the England-India flight. The North Sea Aerial Navigation Co., Ltd. operate an aerial service with Kangaroos between England and Holland

FOREIGN NEWS

London Aerial Derby

The fifth Aerial Derby, the second since the signing of the Armistice, took place on Saturday, July 24, 1920. The start and finish took place at the Hendon Aerodrome and the course to be covered consisted of a double circuit of Greater London totaling approximately 200 miles.

The result was as follows:—

Aerial Derby

Winner of the Royal Aero Club Trophy and £500 for the fastest time.—Martinsyde, Ltd.; F. T. Courtney (pilot); Martinsyde "Semi-Quaver," 300 h.p. Hispano-Suiza. Time, 1 hr. 18 min. 12⅕ sec. or an average speed of 153½ mls. per hr.

Handicap.

1.—(Winner of the Royal Aero Club Cup and £250.)—A. V. Roe and Co., Ltd.; Captain H. A. Hammersley, M.C. (pilot); Avro "Baby," 35 h.p. Green; handicap, 1 hr. 34 min. Time, 2 hr. 32 min. 6 sec.

2.—(Winner of £100.)—Bert Hinkler (entrant and pilot); Avro "Baby," 35 h.p. Green; handicap, 1 hr. 41 min. Time, 2 hr. 45 min. 46 sec.

3.—(Winner of £50.)—Martinsyde, Ltd.; F. T. Courtney (pilot); handicap, 1 min. Time, 1hr. 18 min. 12⅕ sec.

Entries.

Entrant and Pilot	Aircraft and Engine
Bert Hinkler, Bert Hinkler	Avro "Baby," 35 h.p. Green
A. V. Roe and Co., Ltd., Capt. H. A. Hammersley, MC.	Avro "Baby," 35 h.p. Green
Leth Jensen, Leth Jensen	S.P.A.D. "S.29," 80 h.p. Le Rhone
F. S. Cotton, F. S. Cotton	D.H. 14A, 450 h.p. Napier "Lion"
Lieut.-Col. F. K. McClean, Capt. W. L. Jordan, D.S.C., D.F.C.	Sopwith "Snipe," 200 h.p. B.R.2
Major-Gen. The Rt. Hon. J. E. B. Seely Col. Ivan Davson Capt. Sir John C. E. Shelley-Rolls Flight-Lieut. W. H. Longton, D.F.C.	Sopwith "Snipe," 200 h.p. B.R.2
Flight-Lieut.- J. S. T. Fall, R.A.F. Flight-Lieut. J. S. T. Fall, R.A.F.	Sopwith "Snipe," 200 h.p. B.R.2
A. V. Roe and Co., Ltd Capt. D. G. Westgarth-Heslam	Avro "Schneider," 230 h.p. Siddeley Puma
The "Nieuport" and General Aircraft Co., Ltd., John Herbert James	Nieuport "Nieuhawk," 320 h.p. A.B.C. Dragonfly
Martinsyde, Ltd., R. H. Nisbet	Martinsyde "F.6," 300 h.p. Hispano-Suiza
Squad.-Leader T. O'B. Hubbard, M.C., R.A.F., Squad.-Leader T. O'B. Hubbard, M.C., R.A.F.	Martinsyde "F.4," 300 h.p. Hispano-Suiza
Sopwith Aviation and Engineering Co., Ltd., H. G. Hawker	Sopwith A.B.C., 320 h.p. A.B.C. Dragonfly
Bristol Aeroplane Co., Ltd., C. F. Uwins	Bristol "Bullet," 450 h.p. Bristol Jupiter
Martinsyde, Ltd., F. T. Courtney	Martinsyde "Semi-Quaver," 300 h.p. Hispano-Suiza
The "Nieuport" and General Aircraft Co., Ltd., L. R. Tait Cox	Nieuport "Goshawk," 320 h.p. A.B.C. Dragonfly

The progressive speed of the Aerial Derby is shown by the following comparisons:

	Miles per hour.
1912—T. Sopwith	59
1913—G. Hamel	76
1914—W. C. Brock	72
1919—Capt. G. Gathergood	129½
1920—F. T. Courtney	153½

French Plan Big Part in Commercial Aviation

France, whose strong war aerial force, in men and materials, has been allowed to disintegrate, is determined to win a big place in commercial aviation, P. E. Flandrin, aviation undersecretary, told the chamber of deupties when it voted 300,000,000 francs for civil and military air service.

The development of the all-metal aeroplanes, he suggested, is one of the most important things being sought, and, he said, German attempts along this line seem more dangerous than any clandestine deposits of war materials.

M. Flandrin told of typical flights in other nations, such as the New York-to-San Francisco race and the American postal routes, and then reported that the Paris-London aeroplanes covered 120,000 miles, carrying 803 passengers on 513 flights during the period from last September 1 to March 1, when winter atmospheric conditions were bad. On only seven per cent of the trips was there more than an hour's delay, and only one accident, in which an American passenger was killed.

The progress of aviation during the war, M. Flandrin said, raised aeroplane flight speed from 78 to 148 miles an hour; lowered the time for reaching altitudes by four-fifths; increased the power limit from 100 to 1,000 horse-power; multiplied the carrying capacity by more than six and quadrupled the flight range.

Maintenance of way of the London-Paris airline, he said, comprising hangars, landing stations, meteorological stations, etc., cost 33,000 francs a mile, but can be cut in half as a result of the experience gained.

Plan Franco-Swiss Service

A regular aeroplane service between Paris and La Chaux-de-Fonds (west Swiss border) to connect with the present London-to-Paris service, is being planned. The main object of this scheme is to transport watches to Paris and London, and thence to the United States. A special center for Swiss watches has recently been opened in London, and it is expected that the new aeroplane service will be very successful on account of the high value but small bulk of the cargo.

A Dutch-Swiss Service

A plan is being worked out for an aerial service by means of hydroaeroplanes flying over the river Rhine, between Zurich and Holland, the initiative being taken by a Swiss concern. The French Government has been asked to install a customs station on the Rhine near the Swiss frontier or at Strasbourg.

The Brazil Military Flying School Active

The first batch of aeroplanes for the new military aviation school at Sâo Paulo were delivered there in April, and it was hoped that they would be erected in time for the inauguration of the school on May 2nd. The machines are Curtiss J.N.4s and Orioles.

Lieutenants Napoleâo de Almeida and Santos Ferreira, of the Brazilian Army, have taken their brevets at the Military School of Flying under the direction of Major Orton Hoover.

Through the President of the Aero Club of Brazil, the Handley Page firm has offered as a gifft to the Brazilian military flying school one complete 150 h.p. Hispano-Suiza engined S.E.5.

Savoia Flying-boats for Sweden

Three Savoia 13 flying-boats left Sesto Calende recently for Stockholm, piloted by Naval Lt. Maddalena, by Sub-Lt. Longo, and by Petty Officer Berlingeri, and carrying in each machine as passenger an officer belonging to the Royal Swedish Navy, to which the boats were to be delivered.

Warns Swiss Not to Buy Aeroplanes of Germans

Geneva.—The Swiss newspapers recently warn Swiss firms against buying German airships or aeroplanes at low prices owing to the present exchange rates.

It is said by the newspapers that these aircraft are the property of the Allies, according to the treaty of Versailles, and that buyers and sellers are liable to a fine aggregating 100,000 marks, and also that all machines are liable to confiscation.

New Japanese Aviation Records

Lieut. Takikawa, of the Army Flying Corps, on a Spad biplane (200-h.p. Hispano-Suiza), reached a height of 6,000 metres at the Kagamigahara army aerodrome, which is a Japanese height record.

Subt-Lieut. Akashiba, of the Naval Air Service, on a Kaigunshiki seaplane (260-h.p. Hispano-Suiza), beat the Japanese duration record with a flight of 11 hours 35 minutes.

Safety in the Air

The record of civil aviation for a period of nine months shows that the Handley Page Continental Services have covered 107,417 miles without a single case of accident involving death or injury to passengers. The Aircraft Travel and Transport Service has flown about 149,275 miles with but one accident. The total record of nearly 257,000 miles with the loss of a single passenger is not only calculated to lessen the insurance premiums, but is a practical illustration of the value of science and experience. Apparently the risks of flying are not greater than those of the railway and road.

Air Mail in China

A permanent aerial mail service in connection with the Chinese Post Office has been established. The first aeroplane used was a Handley-Page, and on its first journey it carried fifteen passengers and the mails between Peking and Tientsin. Among the passengers were the British Minister at Peking and members of the Legation staff, General Ching and Mr. Wei.

For the first time in the history of the Chinese Post Office, letters posted at 5 P. M. in Tientsin were carried on the return journey and delivered in Peking at eight o'clock the same evening. Stamp collectors will learn with interest that a special post-mark was used by the Chinese Post Office in connection with the first aerial post.

Germans Surrender L-64 to British

London.—The German airship L-64, slightly larger than the British dirigible R-34, which last year made a transatlantic voyage, was surrendered at the Pulham aerodrome recently in accordance with the terms of the Treaty of Versailles.

Prohibited Area in Holland

It is notified that the Dutch Minister of Ways and Communications has determined that the air space above the Doorn area, where the Kaiser is interned, must be avoided by aircraft other than Netherland military aircraft. The area is delineated as follows: Line: Driebergen Station—Culemborg railway bridge; Lek and Neder-Rijn from Culemborg railway bridge to the ferry at Amerongen. Line: Ferry at Amerongen to the crossing-point of the railway lines Rhenen—Amersfoort and Arnhem-Utrecht; railway line between the said crossing-point and Driebergen Station.

British Receive the L-71

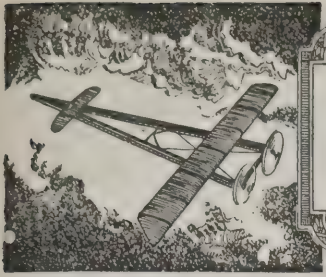
The Air Ministry announces that L-71, the first German airship to be surrendered under the terms of the Peace Treaty, has been handed over at Pulham airship station.

Although it has been known for some time past that the giant Zeppelin L-71 had been completed ready for surrender by Germany under the terms of the Peace Treaty, the actual time and date had been kept a profound secret, and so when the huge vessel was sighted approaching the Pulham (Norfolk) Aerodrome very few people other than the staff at the aerodrome were aware of the fact. It was impossible, however, to effect an immediate landing, due, it is said, to a superfluity of gas, and to enable some of this to be discharged the airship circled round the district for a considerable period, and then headed for Norwich where the appearance of this leviathan of the air attracted the attention of the townspeople, and large crowds gathered to catch a glimpse of her as she sailed over the city. Returning to Pulham about two o'clock, a perfect landing was made. A landing party of about 300 had been mustered in readiness, and when ropes were dropped from the airship eager hands rushed to grasp them, and in a comparatively short time L-71 was safely housed in the shed which had been prepared for her reception. The ship had been blackened over, and every sign of its nationality removed.

The L-71 was completed in 1918, and possesses the greatest lifting capacity of any of the Zeppelins. She has a cruising speed of seventy-two miles per hour—a trifle less than the L-70. The airship left Alhorn (Germany) and her crew consisted of twenty-one Germans, two German officers, and three British officers.

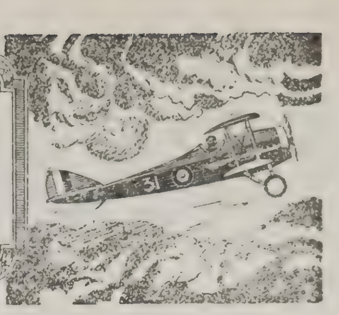
The Disposal of Surplus Aircraft

The Under-Secretary of State for Aeronautics will receive representatives of the following aeronautical firms: Blériot, Bréguet, Caudron, Potez, Farman, Buel, Hanriot, Lioré, deMarçay, Latécoère, Salmson, Peugeot, Chausson, Louis Clément, the Compagnie Aérienne Française la Franco-Bilbaine, and the Syndicat du réseau aérien trans-africain. The meeting will discuss in detail proposals for the purchase of surplus stocks of aeronautical material. The disposal of war material is still causing great trouble in France.



ELEMENTARY AERONAUTICS
and
MODEL NOTES

By John F. McMahon



THE CONSTRUCTION AND DESIGN OF "AVIETTES"

(Continued from last week)

After the bicycle is secured, the wings should be constructed. I would suggest a biplane with an upper wing 5-foot chord and 18 feet wide, the bottom 5-foot chord and 12 feet long, which will leave an overhang of 3 feet for the upper wing. This will tend to keep the machine balanced and stabilized while in flight. For this reason I would not suggest ailerons on the wings for a beginner. These can be put on when the operator has become accustomed to flying.

To make the machine leave the ground after sufficient speed has been attained the planes must be tilted to a positive angle of incidence or a tail with control surfaces must be attached to cause the machine to assume the proper angle whereby the wings will be set at 10 degrees to the line of flight.

It is understood, of course, that while the machine is running on the ground the planes have a zero angle of incidence to keep down resistance.

To move them from zero to 10 degrees, or to move the tail-flaps, the builder will have to provide some method such as tilting the handle-bars or pulling a lever to which control wires are attached and connected with the control surfaces or wings. This, I believe, can be worked out by the reader. Numerous methods can be applied.

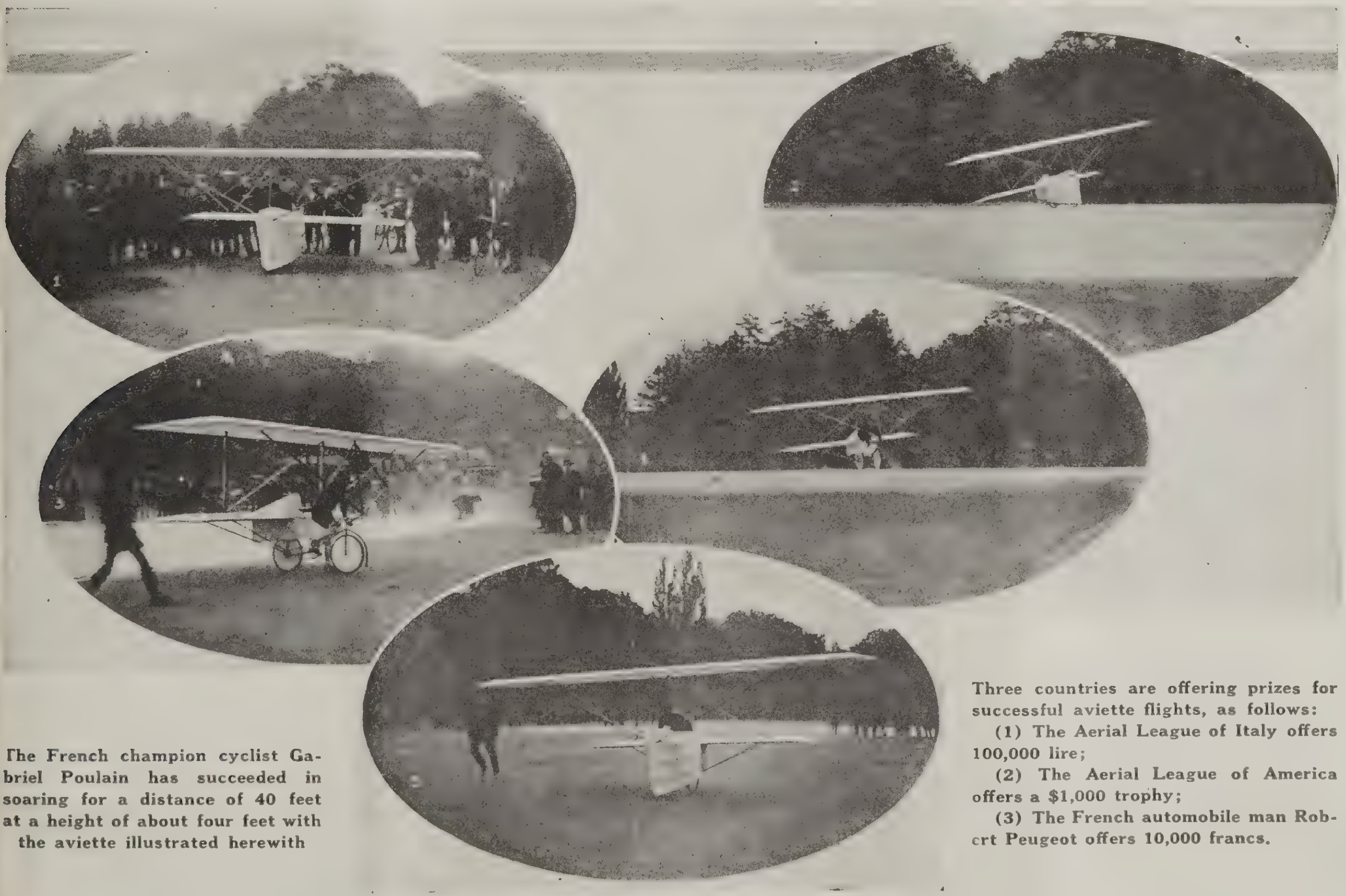
I would suggest putting the lower plane on a line with the top crossbar of the bicycle and the upper plane 4 feet above and staggered forward 8 inches. One set of struts on each side could be fastened to light fittings attached to the upper and lower wing spars. The wing spars should be spruce or fir ¾ inch by 1¾ inches. The ribs spaced 16 inches apart. The webs of the ribs ⅛ inch thick and lightened, the flanges ½ inch by ⅛ inch. The entering edge ¼ inch by ¾ inch spruce or fir and the trailing edge steel wire.

A covering of cheap muslin doped with three coats of aero varnish finishes the wings.

A body built up of light strips should enclose the pilot. The top and bottom decks should be left open where his body and feet protrude. Have this space amply large enough to allow free movement. One-half-inch-square strips spaced 8 inches apart around ¼-inch veneer formers, lightened out, should prove light enough. The body is then enclosed with muslin and doped.

The total weight of the machine, which includes wings and bicycle, should not go above 100 pounds.

If the center of gravity comes at a point in line with the center of pressure the machine will fly without trouble. The center of pressure should be approximately one-fifth of the distance between the leading and trailing edges of the wings.



The French champion cyclist Gabriel Poulain has succeeded in soaring for a distance of 40 feet at a height of about four feet with the aviette illustrated herewith

Three countries are offering prizes for successful aviette flights, as follows:

(1) The Aerial League of Italy offers 100,000 lire;

(2) The Aerial League of America offers a $1,000 trophy;

(3) The French automobile man Robert Peugeot offers 10,000 francs.

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Higher and Higher

In airships all may soon set out
To sail across the skies;
And as we leave the earth, no doubt,
The rates will also rise.

Fast Landing of High Prices

A New York hotel has built a landing place for high flyers. But all hotels will continue to let high prices land where they may.

"On Start"

After the rain, calm's the air, and mirrorlike the waters,
A cheerful sunshine lights the silv'ry sky;
'Tis high visibility with no wind—good flying weather,
And the airman rolls his ship—"on start".

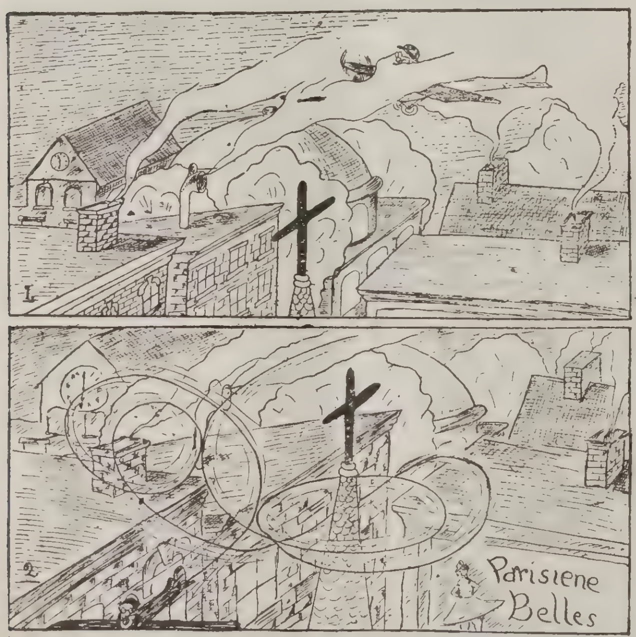
—*Paul Nami.*

Cristobal, C. Z., Panama.

A Regular Stunt

Ferguson: "I've just been reading that the aviators today can do anything a bird can do. Yes, sir, they've got the thing down so fine that there isn't a bird alive that has anything on them."

Fitzgerald: "Zatso? Well, when you see an aviator fast asleep hanging onto a branch of a tree with one foot, then I'll come and take a look."



Courtesy The Naviator

Snow Bird Pete, Official Sniffer for the Anti-Saloon League out on his morning sniff inspection gets absolute proof that something is being brewed that carries a REAL KICK

In On the Clean Up

First Lunch Hound: "Well, old strawberry, howsa boy? I just had a plate of oxtail soup and feel bully."

Second Counter Fiend: "Nothing to it, old watermelon. I just had a plate of hash and feel like everything."

—American Legion.

Us Heartbreakers

"You say the anguish suffered after the war was greater than that during the war; how was that?" asked the sweet young thing.

"Well," replied the aviator, expanding his chest, "you see the French girls took our going away so hard."

Fair Enough

"Well, my dear, I've just had my life insured for $5,000."

"Oh, how sweet of you! Now I shan't have to keep telling you to be careful every time you fly."

The Devil's Due

"Y'r honor," explained the traffic cop, "he was burnin' up the pavement like the old Nick himself."

"Guess that's right," agreed the humorous autoist. "You see I'm a regular speed devil."

"Fair enough," countered the judge. "Then I'll fine you twenty dollars for being in such a hell of a hurry."

A Good Alibi

When an aviator doesn't get in on time at night, he can always stave off wife's curtain lecture by telling her that the atmosphere conditions made it unsafe for him to attempt to alight.

Yes, And a Harp

"If you fell, would you need a new pair of wings?" asked the innocent young thing.

"I'd probably get them—and a golden harp besides," answered the other young thing, who was a little yiser.

No Rush

"I'll bet you were in a hurry to get back to the earth," chaffed the friend, after Johnnie's initial experience in the sky.

"On the contrary," answered Johnnie, "my one fear was that I would get back too quickly."

More "Exams"

"A centrifical force is one equal all around, when hitting a ball the force on it is the same all around till it lands."

"Scientific force is that which changes size and shape of a body, as the spring balances the weight changes the shape and size of the spring."

"Centrifigular force is a force acting on one point such as the works of a clock or automobile."

"Cyntrivical force is a force that goes round an axis—the electric fan for instance."

"The artic circle bounds the fridget zone."

"When melted sulphur becomes very hot it becomes vicious."

"Moisture gets into the air by sublimation, evaporation and respiration."

From An Oxford Notebook in The Observatory, June, 1920.

NOW READY

Textbook *of* Aero Engines

By

E. H. SHERBONDY
Consulting Engineer
Consulting Engineer to Airplane Engineering Department, U. S. War Department,
Consulting Engineer to Naval Consulting Board

and

G. DOUGLAS WARDROP
Managing Editor of "Aerial Age Weekly"
Member Aerial League of America, Aero Club of America, Society of Automotive
Engineers, American Society of Mechanical Engineers, American
Society of Naval Engineers, Franklin Institute, etc.

DEVELOPMENTS of tremendous importance in aero engines occurred during the war period, and realizing that there was not available an authoritative work of a thoroughly up-to-date character on aero engines, The Frederick A. Stokes Company arranged with E. H. Sherbondy and G. Douglas Wardrop to prepare a comprehensive volume, dealing with the principles and theory of aero engines, and describing completely all of the successful aero engines that have been developed during the war.

This volume will comprise 400 pages of large size, seven inches by ten, presenting a very full discussion of every important phase of the subject and also the presentation of photographs and diagrams of a size to be of value to the designing engineer and student.

The work has been prepared for the purpose of having in one volume the complete information concerning all modern types of aero engines and an up-to-the-minute discussion of the principles of aero engine design and construction, so that the reader may be able to undertake comparative research without recourse to a formidable list of volumes and publications, which in any event could only supply him with more or less obsolete information.

TO THE FREDERICK A. STOKES COMPANY,
Fourth Avenue, New York.

Please send me a copy of the Textbook of Aero Engines, by Sherbondy and Wardrop, for which I enclose my check for ten dollars herewith.

(Signed) . . . .

(*Continued from page 767*)

despotic by-laws, which violate Section 14 of the Membership Corporation Law of the State of New York and practically abolish the constitutional rights of the members of the Aero Club:

"Section 1. The terms of office of all officers, governors and committees elected or appointed prior to August 16th, 1920, shall expire at the conclusion of the Special Meeting of the Club of that date and new Governors shall be elected at such Special Meeting, without nomination as hereinafter provided for in Section 5 of this Chapter, for such terms as may be specified in the Election. Thereafter

"The Governors shall be elected by ballot at the annual meeting of the Club. The polls shall remain open for one hour.

"Section 2. The Board shall consist of twenty-four members of the Club, at least eighteen of whom shall be resident members of the Club, designated as 'Governors, Class A.' The remaining six may be either resident or non-residnt members, and shall be designated 'Governors, Class B.'

"Section 3. The Governors, Class A, shall hold office for the term of three years and until their successors are elected. The Governors, Class A, shall be divided into three groups of six governors each, so that the term of office of one group of six Governors, Class A, shall expire each year.

* * * * * *

"Section 6. The President and the Vice-Presidents shall be elected by the Board of Governors at a meeting held on August 16th, 1920, and shall hold office until the next annual meeting of the Club. Thereafter

"The President and the Vice-Presidents shall be elected by the Board of Governors at a meeting held on the second Monday in November, immediately following the annual meeting of the Club, and shall hold office for one year and until their successors be elected."

These proposed by-laws violate Section 14 of the Membership Corporation Law of the State of New York, which provides that in changes of by-laws regarding directors "each director shall serve until his term expires."

Under Chapter VIII, Section 1, occurs the following vicious absurdity, which would permit the defendants in the name of the Board of Governors to expel members of the Club who own publications—like Ralph Pulitzer and Herbert Pulitzer, owners of the New York *World;* Ogden Reid, owner of the New York *Tribune;* Rodman Wanamaker and James Elverson, owners of Philadelphia newspapers; Henry Woodhouse, owner of several aeronautic publications, and other owners and editors of publications, if they should print anything pertaining to the Club, which the members of the Board who are trying to obtain control of the Club under misrepresentations might not like:

"Section 1. * * * No member shall use the Club stationery for business purposes, or date or address from the Club any business letter, circular or document, or imprint the name of the Club upon his stationery or business documents or publications."

It will be noted that this provision also deprives the members of the privilege of using Aero Club stationery to which the Club agreed when they joined the Club.

They have also eliminated the provision which provides for a weekly meeting of the Board of Governors to attend to the Club business and have replaced this provision with the following preposterous by-law, under Chapter IV:

"Section 2. The Annual Meeting of the Board of Governors shall be held on the second Monday in November, immediately following the annual meeting of the Club, and regular meetings shall be held on the first Wednesday of each month from October to June inclusive, at such hour as may be fixed by the Governors. Special meetings may be called by the President or by any five members of the Board."

The abolishing of the weekly meeting of the Board of Governors of the Club is a crippling provision; and holding only one meeting a month, and no meetings from June to October—the very months when the Club's official activities are greatest—would prevent the Club from directing, supervising and officiating at aeronautic events throughout the country, granting sanctions for such events, granting licenses to aviators, accepting new members, etc., etc.—would completely destroy and discredit the Aero Club of America as a national organization.

The undersigned are collectively members of over one hundred Clubs and national associations, and officers and trustees of a number of said Clubs and associations and are familiar with general practice and procedure for revising the constitution and by-laws of organizations and can truly submit and state that the procedure and methods adopted by these few individuals to get control of the Aero Club are against all rules and regulations and practice and positively unethical and unfair, and violate the written and unwriten laws which govern the affairs of membership organizations.

The regular procedure when revision of the Constitution and of more than one of the By-Laws is proposed is by ballot, giving due notice of each of the proposed changes, and the benefits to be derived by such changes and giving an opportunity to the members to vote on each of the proposed changes, and allowing at least sixty days before the vote is taken, so that all the members can be reached and all have an opportunity to make a thorough study of the proposed changes and their effects on the welfare of the organization. Above all members are not asked to vote on proposed by-laws which would violate the Membership Corporation Law of the State.

The present procedure not only disregards the above rules, and violates the State laws, but the notices to members also failed to specify the number of proposed changes in the by-laws and have concealed the financial deficits amounting to over $50,000 a year which they are planning to make the Aero Club and its members assume in taking over the operation of the Flying Club House, and also fail to state that one of the proposed changes in the by-laws increases the dues of resident members and another will decrease the number of out-of-town Governors, therefore will tend to localize the Aero Club by decreasing the number of Governors that can be elected from different sections of the country. If there is a justification for these it should be stated.

Article Seven of the Constitution of the Aero Club of America, which prescribes the procedure to be followed to amend the Constitution of the Club, reads as follows:

ARTICLE VII

Amendments.

Section 1. The Constitution may be amended only by a vote of two-thirds of the members present in person or by proxy at a regular or special meeting called for the purpose.

Section 2. No proposition to amend this Constitution shall be acted upon at any meeting of the Club unless it shall have been presented to the Secretary, signed by at least twenty-five members, and a notice embodying the purport of the proposed amendment shall have been sent to each member of the Club in the call for such meeting, which notice shall be sent at least eight days prior to the date of the proposed meeting.

We learn with regret and disgust that certain members of the Club, in violation of the above articles of the Constitution of the Club, are circulating proxy forms and seeking to hold an irregular meeting of the Club in violation of the above articles of the Constitution, and we hereby formally protest and advise you that it is our intention to call a meeting of the Club on August 28 to protest against the actions of these individuals and prevent their irregular action by this method and as provided by the laws of the State of New York.

SIGNED BY:

Henry Woodhouse (Governor),
Charles J. Glidden (Governor),
John Hays Hammond, Jr. (Governor),
Big.-General Robert K. Evans, U. S. A. (Retired), (Governor). (General Evans has given his proxy to Mr. Woodhouse, having to leave for Europe.)
Capt. Robert A. Bartlett,
Major Granville A. Pollock (Governor). (Major Pollock gave his proxy to Major Glidden on his departure.)
Rear Admiral W. N. Little, U. S. N., Rt.,
Lieut. C. E. Ruttan, U. S. N.,
Major John E. Hausmann,
Capt. H. S. Broad,
Thomas F. Powers (Member Law Committee),
G. Douglas Wardrop,
Major John Inwood,
Jos. A. Steinmetz (President Aero Club of Pennsylvania),
Edgar B. Davis,
K. M. Turner (President Aero Club of Southern California),
Lieut. Roy W. Ammel,
Lieut. Edward B. Watson, Jr.
Capt. R. B. Berry,
Capt. C. R. Collins,
William S. Gilmore,
Lieut. Edgar H. Garland,
Lieut. Milton A. Stone,
A. M. Welsh,
Thomas M. Finlay,
W. E. D. Stokes,
Alfonso Taveral,
Carlysle D. Straub,
Lieut. Raymond B. Quick,
Lieut. N. H. Kibby,
Lieut. C. A. Wright,
Lyman W. Cleveland, Jr.,
Charles F. Willard,
Arthur B. Rose,
Wm. H. L. Howard.
Everett B. Johnson,
C. S. Macdonald,
Lieut. Ralph Kiely, U. S. N.
Captain R. A. Edlundh,
Captain Robert D. Wann.

UNIVERSITY OF ILLINOIS
AUG 24 1920

AERIAL AGE
WEEKLY

l. 11, No. 24 AUGUST 23, 1920 10 CENTS A COPY

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Airscape of the Gatun Locks of the Panama Canal

Aerial League of the World Organized

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AERIAL AGE
WEEKLY

VOL. XI AUGUST 23, 1920 NO. 24

TABLE OF CONTENTS

PAGE
Aerial League of the World Organized 797
Evidence of Vicious Conspiracy To Destroy Aero Club of America Submitted to Supreme Court 798
The News of the Week 800
The Aircraft Trade Review 802
U. S. Aerial Mail 803
The Wisenant Longitudinal Aeroplane 804
Book Reviews 805
Methods of Measuring Resistance of Insulators at High Temperatures. 806
Special Meeting of A. C. A. to Be Held August 28th 810
Naval and Military Aeronautics 811
Foreign News 812
Elementary Aeronautics and Model Notes 813
Aeronitis 814

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AERIAL LEAGUE OF THE WORLD ORGANIZED

THE completion of the plans for organizing an international aeronautic body to be known as the Aerial League of the World, was announced today by Major Charles J. Glidden, the founder of the Glidden Tours (Automobile), a pioneer in aeronautics since 1905 and Acting Chairman of the Contest Committee of the Aero Club of America.

The plans for the organization of the Aerial League of the World have been under way for a number of months and during the trip around the world, Major Glidden organized committees and appointed commissioners in sixty different countries, colonies and possessions throughout the world, which will help the Aerial League of the World in carrying out this aeronautic events and activities throughout the world.

Twenty Latin American Republics Represented

"South and Central America will be represented in the Aerial League of the World by the Pan-American Aeronautic Federation and Alberto Santos-Dumont its Honorary President is a Vice-President and Commissioner of the League," said Major Glidden.

"The twenty Latin-American Republics are anxious to develop aerial transportation and have been flooding us with requests for information and assistance. There is so much important pioneer work to be done in those countries that it becomes necessary to do it in an organized way, and as much as possible, it should be done through the locally established bodies and committees, and under the direct supervision of leading men in each of the Latin-American countries. For this reason the Aerial League of the World has arranged for the activities to be conducted with the co-operation of the Pan-American Aeronautic Federation and under the general supervision of Alberto Santos-Dumont who, it will be recalled, was the first man to navigate a dirigible, which happened in 1901, and the first man to make an aeroplane flight in public, which took place in 1906.

Purposes of League Practical and Far-Reaching

"The broad purposes of the Aerial League of the World are as follows:

"(1) To encourage the use of aircraft for all purposes throughout the world;

"(2) To promote safety in aerial navigation and in the construction of aircraft, aerodromes, accessories, etc.

"(3) To encourage and urge the establishing of suitable landing places for aircraft all over the world and standardize said landing places and equip them with standardized lighting and signalling devices and guiding lights to facilitate aerial navigation;

"(4) To cause and urge the establishing of recognized Airways throughout the world to interconnect aerially all the world's commercial centers, and wherever aircraft can solve problems of transportation;

"(5) To provide a scientific and practical solution to the difficult problem of operating permanent aerial transportation lines at night and in fogs, over fixed routes, without danger of collision to aircraft flying in opposite directions, by bringing about the adoption of airways eighty miles wide, which will permit aircraft, by keeping to the right, to avoid collision even if they should deviate from their course, owing to wind drift.

"(6) To establish a protective organization which will undertake to protect airmen legally in securing national and international legislation and the adoption of proper rules of the air and regulations to govern aerial navigation and to protect the interests of owners and users of aircraft against unjust and unreasonable legislation, and to maintain the lawful rights and privileges of owners and users of all forms of aircraft whenever and wherever such rights and privileges are menaced, as for instance in preventing the adoption of restrictive aerial laws, discouraging overcharging when airmen damage property, prosecuting persons for wilfully placing obstructions on aviation fields, or crowding aircraft landing fields, extinguishing guide lights, destroying land marks, selling watered gasoline to aviators, selling inferior hydrogen and gas to ballonists, etc., etc.

"(7) To standardize aircraft insurance rates and insurance adjusting;

"(8) To establish aeronautic information bureaus throughout the world;

"(9) To study the possibility of air travel in different countries and prepare maps of airways;

"(10) To establish a clearing house of aeronautic activities where people interested in aerial touring, commercial aerial transportation and air travel can get practical information and assistance;

"(11) To organize aerial exploration and surveying expeditions;

"(12) To co-operate with Aerial Leagues, Aero Clubs and other organizations, aerial transportation companies, travel agencies, chambers of commerce, manufacturers, and other

(*Continued on page* 810)

EVIDENCE OF VICIOUS CONSPIRACY TO DESTROY AERO CLUB OF AMERICA SUBMITTED TO THE SUPREME COURT

Affidavit presented to Supreme Court by Henry Woodhouse, continued from August 9, 1920, issue of AERIAL AGE:

How "Flying" Was Given Up, Insolvent, by the Aero Club and Taken Over and Made a Success by Mr. Woodhouse

Deponent began to assume, personally, financial and other obligations of said club in 1912 and succeeding years, as follows:

In the year 1912 a magazine named *Flying* was published for and on behalf of the Aero Club of America and its official organ. Said magazine was a most valuable medium through which to educate the American public and the American Government in the need of developing aeronautics and in making known to the country the work of the Aero Club of America. However, this magazine was published at a monthly loss of over one thousand dollars, and the Board of Governors of the Aero Club of America decided to discontinue same, regardless of the effect which the discontinuation would have on the club and in the public mind and the press, by creating the impression that the development of aeronautics was not sufficiently important to justify the continuation of such a magazine in continuing its educational work.

Thereupon, the deponent offered to assume part of the deficit of continuing said publication if members of the Board of Governors would do likewise; and when the Board of Governors of the club declined to contribute to making up said deficit, deponent offered to continue the publication of said magazine, *Flying*, at his own expense, under the agreement that said publication would continue to be the official organ of the Aero Club of America, which contract was agreed to between the Board of Governors of the Aero Club of America and the deponent on or about January, 1913. Deponent assumed this financial obligation to assist the club and has carried out his obligation at serious sacrifice and financial loss to himself during the past nine years.

During the year 1912 deponent was invited and requested by members of the Board of Governors of the Aero Club of America to become Honorary Secretary and take an active part in the management of said club, which deponent declined to do. The invitation was repeated on a number of occasions and deponent was asked to assist the Board of Governors of the club in solving some of the difficult problems, including financial problems, which perplexed the Board of Governors of the club at that time. As deponent declined to become an officer of the club, he was invited to be present at the meetings of the Board of Governors and of the Executive Committee of the Aero Club of America, and to give the board and the committee the benefit of his advice. While acting in this advisory capacity he learned that the club was facing an annual deficit of twenty thousand dollars and noticed that by the continuous failure on the part of most of the resident members of the Board of Governors to attend meetings that, unless some concrete action was taken immediately the existence of the club would have to come to an end or else the officers and members would have to be burdened with large assessments which, obviously, would result in resignations.

Club Was Abandoned, Insolvent, in 1912

Deponent held a long conference with Mr. Robert J. Collier, who was then president of the Aero Club of America, and was advised by the latter that he could not continue to guarantee the deficits of the club, but had offered to give five thousand dollars to the club to be spent either to make up the club's deficit or the deficit of publishing the club's official organ, *Flying*. The Board of Governors of the club had accepted Mr. Collier's five thousand dollars to go towards meeting the deficit of the club. Mr. Robert J. Collier resigned as president of the club in 1912 and was succeeded by Mr. Alan R. Hawley, who took up the management of the affairs of the club in a most able manner. But the club did not have the organization or the funds for conducting an extensive campaign of aeronautic activities and for public education, and, lacking these activities, and failing to educate the public as to the importance of aeronautics, the club had no substantial appeal to make for membership. As a result, members resigned in a large number and it was almost impossible to secure new members.

It was also almost impossible to get the members of the Board of Governors to attend the meetings, and to meet this general neglect of duties on the part of members of the Board of Governors the by-laws of the club were amended to provide for the dropping of members of the Board of Governors who failed to attend the meetings of the board for three times in succession; provision being also made to reduce the number of governors required to constitute a quorum so as to enable any three members of the board who attended the meeting to decide on whatever business which came before the meeting, subject to approval and ratification at the following meeting, copies of the minutes of each meeting being sent to each and every member of the Board of Governors.

The financial condition of the club grew so serious that at the meeting of June 3, 1914, after unsuccessful efforts to secure a larger attendance at the meeting of the board for the discussion of the club's affairs, the three members of the Board of Governors present decided to close the club house at No. 297 Madison Avenue, Borough of Manhattan, City and State of New York, and take smaller offices for the club elsewhere, and restrict and minimize the activities and expenditures of the club.

Mr. Woodhouse's Offer to Save Club at Own Expense in 1914 Was Accepted

Deponent was duly invited to attend this meeting, which was attended by the following members of the Board of Governors of the Aero Club of America: Alan R. Hawley, in chair; Samuel H. Valentine and W. Redmond Cross. Deponent submitted to these members of the Board of Governors of the club that clubs as organizations can only continue if they progress. They may continue if they stand still, but they invariably go out of business if they take steps which look like retrogressing and assuming a lower position than they have occupied. Deponent then pointed out that the Aero Club of America could become a large, national organization and a powerful factor in developing aeronautics in this country, and that one of its duties was to start immediately to urge the developing of military and naval air forces, as the international diplomatic situation was upset through the Balkan wars, and it was wise and precautious to take steps immediately to develop substantial military and naval air forces, which at that time consisted in the United States of less than twenty Army and Navy aviators, with only about a dozen obsolete aeroplanes and no dirigibles or military observation balloons.

Deponent stated at that meeting that he believed so strongly that it was his duty to start an aerial preparedness movement that he was willing to pay the expenses personally of conducting such a movement and at the same time of starting a campaign for the increase of the club's membership, all of which the deponent offered to do at his own expense.

After considerable discussion it was agreed that the deponent be authorized to conduct the campaign for mmebership on behalf of the club, the understanding being that the club would only pay for the printing of the invitations and that all other expenses were to be met by the deponent. The following resolution, which is part of the minutes of the meeting referred to, under date of June 3, 1914, was adopted:

"The meeting was given up to a thorough discussion of the club finances and the matter of renewing the lease of the club house.

"After due consideration and exchange of opinion, it was decided that Henry Woodhouse be authorized to push forward without any delay his plan verbally outlined at the meeting, viz.: that of circularizing two thousand persons, soliciting their membership in the club, it being understood that the sums to be expended in this effort must not exceed $200, and that the date of August 15, 1914, be fixed to terminate and decide the issue of this plan, it being the sentiment of the board that, if not successful, other quarters for the club be found."

The deponent thereupon assumed at own expense the responsibility of solving the financial problems of the club, and, entirely at his own expense and by personal efforts, which were authorized, approved and praised periodically by the Executive Committee and the Board of Governors, conducted the enormous patriotic and progressive campaigns on behalf of the Aero Club of America which resulted in the club securing over two thousand members. The deponent himself proposed for membership or caused to join the club over one thousand of his friends and acquaintances, whose dues and initiation fees assisted in wiping out the club's annual deficits and made the club self-supporting and made it possible to accumulate a large surplus in the club's treasury.

Elected Governor For Having Saved "Flying" and Club

In September, 1914, deponent was asked by the members of the Board of Governors to accept the nomination for governor of the club, "Class A" and was unanimously elected by the membership of the club in November, 1914, for a term of four years, ending November, 1918; and at the expiration of this term he was re-elected for a term of four years, ending November, 1922.

At the annual meeting of the year 1914 the following resolution of appreciation and recognition of deponent's work on behalf of the club and for taking over the liabilities of the club's magazine, *Flying:*

"WHEREAS, Our associate, Mr. Henry Woodhouse, by the masterly manner in which he has conducted his publication, "Flying," and his untiring support of the efforts of the Aero Club of America, has proven himself an important factor in the development of the aerial movement in this country, therefore be it

"RESOLVED, that Mr. Henry Woodhouse be congratulated upon the signal success of his work, and be extended the thanks of the Aero Club of America at this, its annual meeting for the year 1914."

The minutes of this annual meeting also record the fact that the noted American scientist Elmer A. Sperry, who had just returned from Europe and was present at the meeting stated that the work of Mr. Woodhouse, the deponent, on behalf of the club was making the club famous in Europe, and (quoting from the minutes of the meeting) "especially dealt with the manner in which Ambassador Herrick praised this organization." He also attested to the international repute of the magazine *Flying* for reliability and progressive and constructive viewpoint.

Asked to Be Relieved In 1916

At the end of 1916, after three years of continuous application of his efforts and continuous financial and other contributions to the club, deponent felt that, whereas the work of the club had resulted in obtaining large appropriations for the building of the military and naval air forces and in the creation of large civilian aerial reserve forces, consisting of over five hundred aviators in training; and believing further that it was his duty to himself and his business to make no further personal sacrifices on behalf of the club, which had now become self-supporting, and believing further that it was his duty to so arrange his plans that in the event of war he would be free from business responsibilities and could concentrate his efforts in the important work of building the Army and Navy Air Forces; for these and other patriotic and ethical reasons he felt it would be best for him to request the Board of Governors of the Aero Club of America to relieve him of the responsibilities of directing and managing the club's affairs in future. Accordingly the deponent wrote to each and every member of the Board of Governors a detailed statement of the club's activities which he had conducted almost entirely at his own expense, as appears by letter dated December 15, 1916, at a cost of approximately fifty thousand dollars including actual cash contributions, paying the salaries of a staff of assistants to do the work, office rent, stationery, postage, telegrams, travelling on behalf of the club, etc., etc. Deponent had never accepted or received any remuneration of any kind from the club, and did not expect any but he had now reached the point where he felt he could not continue, therefore he wrote to each and every member of the Board of Governors of the club, as heretofore stated.

In response to this letter a number of members of the Board called on and wrote to the deponent stating that they could not see how the club could continue the activities under way if the deponent relinquished the active direction of these affairs, and after prolonged urgings on the part of said members of the Board of Governors and in view of the fact that the activities, the nature of which is explained in the following resolution adopted unanimously at the meeting of the Board of Governors of March 7, 1917, which is part of the records of the club:

"WHEREAS, Mr. Henry Woodhouse, having, in the opinion of the Governors of the Aero Club of America, earned an acknowledgment of their appreciation of his extraordinary achievements on behalf of the Aeronautical Movement, the Movement for National Preparedness for Defense, and the Club, and

"WHEREAS, the many undertakings initiated and so successfully carried out by Mr. Woodhouse and his associates having proven of great value to the aforesaid movements, and the club, and

"WHEREAS, among these activities should be mentioned the following:

"The creation of the Pan-American Aeronautic Federation, by means of which the sportsmen of the Americas have been united in a common undertaking of great usefulness;

"The creation and successful conduct of the National Aeroplane Fund, by means of which the American Aeroplane Industry when at its lowest ebb was revived, and the public aroused to the need of active miltiary and naval aeronautic preparation;

"The stimulation of Congress to vastly increase its aeronautical appropriations;

"The instigation of the movement to interest college students in aerial defense, and the developmnt of aeronautics;

"The establishment and successful conduct of the recent Pan-American Aeronautic Show;

"Together with services which he has rendered, and

"WHEREAS, by these activities and his untiring devotion to the cause for which the Aero Club of America stands, and to his colleagues, Mr. Henry Woodhouse has won the admiration and esteem of his fellow governors, therefore

"BE IT RESOLVED: That the Board of Governors of the Aero Club of America hereby tenders to Mr. Henry Woodhouse its thanks and this expression of its appreciation of the invaluable services which he has rendered to the Nation, the Aeronautic Movement, and the Club."

As already stated, in view of the national importance which the work of building the military and naval air forces and organizing civilian aerial reserves had assumed, the deponent consented to sacrifice his interests once more and continue to direct and organize the Aero Club's activities, which included the conduct of the activities referred to in the foregoing resolution, as well as the conduct of the campaign of public education which involved writing, sending to the newspapers, and circulating daily statements regarding the progress of aeronautics, the importance of developing the aerial forces needed for national defense, the progress of developing the civilian aerial reserves and other important developments in the field of aeronautics and in other branches of national defense.

Deponent further states that while the Aero Club of America subscribed to said magazine *Flying* for each member of the club in good standing between the years 1913 and 1918, when said club's finances were limited, deponent was prevailed upon to charge only six to nine cents per copy or a little over one third the cost thereof; thereby causing deponent a monthly loss of a substantial sum as such price did not even pay for the paper used, not to mention printing, and proportionate share of office and overhead. Further deponent suffered additional losses by reason of such arrangement because the organization known as the Audit Bureau of Circulation which investigates the paid circulation for advertisers will only consider as paid subscriptions such subscriptions for which not less than 50% of the actual subscription price had been paid, therefore, deponent could not benefit from advertising by reason of any subscriptions received from the club or its members.

Early in 1913 deponent was requested to take over the magazine Aerial Age which was the official organ of an Aero Club affiliated with the Aero Club of America and prevent its discontinuance and bankruptcy. That in order to save the reflection of such action and its possible bad effects upon such club, deponent assumed its liabilities and continued its publication at his own expense and used said magazine for advancing the work of the Aero Club of America and the aeronautic movement in general.

Reference having been made to the magazine *Air Power* deponent states that soon after America entered the war some U. S. Naval men who had been publishing a service magazine named *Naval Air Pilot* called upon deponent and stated that the accumulation of deficits in connection therewith had so burdened them that they were compelled to abandon it. Realizing the value of such a medium to the men in the service, deponent took same over.

That deponent completed his textbooks for use in connection with the actual training of the military and naval forces and deponent supplied free of charge over 3000 copies of such books to various officers of the United States Army and Navy.

That defendants are not making these remarks in good faith is shown by the fact that at least two of the three defendants were in a position to know that these textbooks were written to help the building of the Air Forces, as there were no such textbooks in existance. Besides sending 3000 copies of these textbooks free of charge to Army and Navy Air Stations, battleships, bureaus of the War and Navy Departments, and other government officials, plaintiff sent copies to each of the members of the Board of Governors of the Club and received from defendants and other governors very appreciative letters, two of which are reproduced herewith.

(*Continued on page* 817)

THE NEWS OF THE WEEK

Zeppelin May Circle Globe

A non-stop dirigible flight around the world will be attempted by the Zeppelin dirigible balloon builders in Germany within the next twelve months, according to a statement by Major Charles J. Glidden, an official of the Aero Club of America, who recently returned from a trip around the world organizing an international aerial derby.

Major Glidden said the Zeppelin firm has long planned to win the distinction of accomplishing the first circumnavigation of the globe by air and would make the attempt soon unless prevented by the Allies.

Enters Second Race for Pulitzer Trophy

The first formal application for entry in the second transcontinental race for the Pulitzer Trophy, which is to be contested early next year, has been made by the Aero Club of Southern California. The first coast-to-coast race for the $5,000 statuette will be in November.

A telegram received by Major Charles J. Glidden, Acting Chairman of the Contest Committee of the Aero Club of America, announced that K. M. Turner, President of the Western Club, had an entry and requested that an application blank be mailed immediately.

It is quite probable that many of the entrants to the first race from New York to San Francisco will spend a few weeks flying in Southern California and fly back to New York in the second race should the Contest Committee here decide to permit flying in either direction. Three of the committee have already signified their desire to do this.

Three entries have been received for the first race.

To Make Movies of Hudson Bay With Seaplane

Toronto.—The great naval seaplane of the Canadian Aero Film Company has left on an 800 mile trip to Hudson Bay, where pictures will be taken for the provincial Government and a survey made for the Dominion Government. The plane is bound for Belcher Island, on the west coast of Labrador, in the bay, and stops are being made at North Bay, Cochrane and Moose Factory.

Propose Aviation Fields on Highways

Wisner Gillette Scott, executive secretary of the Inyo Good Road Club and chairman of the National Parks Division of the National Highway Association, has begun a plea for a series of aeroplane landing fields along the Pacific Coast.

The plea is contained in a special bulletin issued by the Inyo Good Road Club in support of a bill introduced in Congress by John E. Raker, member from California. The measure aims to create a system of motor truck commerce and national defense highways along the Pacific, by assimilation and conversion of the three north and south truck highways and chief laterals in Washington, Oregon and California.

Scott's proposal is to establish landing fields for aircraft along these highways. Regarding the advantages of the fields being there situated he writes:

"Highways, distinctly visible from an altitude of thousands of feet, are most excellent indicators of route, and they would always with unerring accuracy lead the aeroplane pilot to a desirable landing, easily identified by its special marking.

"In event of a forced descent, should there be necessity for information or other assistance, proximity to the highways and to passing motorists would be of extreme advantage.

"If stations or emergency landings to meet the reasonable requirements of aerial navigation were provided, at 25-mile intervals, the space devoted to aircraft would approximate only one-tenth to one-fifth of that devoted to highway for the same distance."

Miss Bromwell Makes Record of 87 Loops

Mineola, L. I.—The world record for looping the loop by women aviators was broken here recently when Miss Louise Bromwell of Cincinnati looped her aeroplane over eighty-seven times. The best previous performance, made last year by a French woman flier, was twenty-five loops.

The record came as part of the ceremonies marking the dedication of the Curtiss aerodrome, formerly Hazlehurst Field, one of the principal army air posts during the war. Driving a Curtiss K-6 standard type, Miss Bromwell went aloft and quickly rose to 8,000 feet. Directly over the field she began the loops.

While observers checked off each complete loop, the young woman kept gradually losing height. She had got down to 1,000 feet when she started a glide to the field.

Miss Bromwell counted 100 loops herself, but her first ones were out of sight of the officials on the ground.

Miss Bromwell received her pilot's license a year ago, when she finished training at the old Curtiss Flying School at Garden City.

Miss Neta Snook, the newest entrant into the ranks of American aviatrices, together with her mother and sister

Transfer Balloon Races to Chicago

The national and international balloon races which were scheduled to take place at Indianapolis on September 11 and October 23, respectively, have been transferred to Chicago, where they will be held on the same dates, according to an announcement made by the Contest Committee of the Aero Club of America. Inability to obtain gas to fill the balloons at Indianapolis was the reason for the change.

The committee announced that there were fifteen entries for the national race, including three army balloons and one navy balloon. Eight entries have been received for the international race, five from foreign countries and three from this country. The pilots for the American balloons are to be chosen from among the leaders in the national race.

Cross-Country Flight Begun in Gallaudet Plane

The new Gallaudet five-passenger Liberty tourist biplane left the Garden City Aviation Field recently on the first leg of a transcontinental demonstration flight. The machine is equipped with a 400-horsepower Liberty motor and carried 1,000 pounds of cargo. Part of this consisted of three cases of perfume, valued at $1,000, one package of which will be presented to Mrs. Woodrow Wilson, in Washington.

Allen Burdon piloted the machine. His brother, Leo, accompanied him as relief pilot, and the other passenger was Dan Kelly, mechanician.

Make One-Stop Flight from N. Y. to Lexington, Ky.

One of the longest continuous flights made in this country recently was accomplished when Captain W. E. Beaver of the British Royal Air Force, who has been stationed in New York, flew to Lexington, Kentucky, with his mechanic, W. Burton. They made the trip from New York, halting once at Cleveland, in eleven hours. The distance is about 860 miles.

Pulitzer Trophy Spurs Civic Bodies

European speed records for cross-country flights by aeroplanes will not be broken by the contestants in the two scheduled coast-to-coast races for the Pulitzer Trophy, according to a statement made by aviation authorities at the Aero Club of America, which is sponsoring the contests. They said the aerodromes of the United States were not level enough to permit high-powered planes to land safely. It is expected, however, that a new American record will be made.

There is only one landing field in the United States that aviation engineers have passed on as safe for planes with a landing speed of more than 100 miles an hour, and that is in California. Other landing fields are safe enough for ordinary commercial and mail planes, but are not fit harbors for the racing planes that have been developed since the close of the World War.

The present record for the transcontinental trip is held by Lieut. Belvin Maynard, who made the trip from New York to San Francisco in slightly less than twenty-five hours' actual flying time last October. This American record for cross-country flying is expected to be broken by the race for the Pulitzer Trophy, which is to be held next November.

Members of the Contest Committee of the Aero Club have been assured that at least one of the American entries in the international aviation race for the James Gordon Bennett Trophy, to be held near Paris on Sept. 27, will be entered in the Pulitzer Trophy contest in November. This machine, a monoplane constructed for S. E. J. Cox of Texas, will be remodelled for the American race. Mr. Cox hopes to enter two machines in the race.

Engineers are drawing plans to add another wing surface to the machine, which will make it a biplane able to carry enough fuel to compete in the cross-country flight. Its speed will be lowered by these alterations, but it is believed that it will still be capable of making more than 150 miles an hour.

An appeal to all of the cities and commercial associations of the country to improve their aerodromes so that they may be considered safe harbors for high speed machines is being made by the Aero Club of America.

The Pulitzer Trophy contest is expected to create the civic interest needed to enforce these betterments.

Aeroplane Aids in City Planning

Guy Wilfrid Hayler, city planning expert, representing Dr. John Nolen, who is making a city plan of the City of Green Bay, Wis., made a flight over that place on July 17th in a Curtiss biplane. The trip was unique as it was the first time in America that the aeroplane has been used in city planning work. The pilot of the machine was Lieutenant Wilfred G. Moore, an aviator formerly of the Royal Flying Corps. Hayler carried maps and made photographs from an altitude of over 2,500 feet. The observations made are likely to be of the greatest help in making comprehensive plans and the flight demonstrates the great possibilities of the use of the aeroplane in planning a city.

Landing Fields for California-Oregon Towns

Arrangements have just been completed whereby two of the smaller cities of California and one in Oregon are to have up-to-date aerial landing fields. These cities are Alturas and Bishop, California and The Dalles, Oregon.

Make Commercial Map from Air

A bird's-eye view map of Washington and surrounding country will be made by the Rand-McNally Company as the result of aerial trips from Bolling Field now being made by representatives of the company.

This company has been asked by the Army air service to undertake the construction of a series of detailed maps showing the territory in certain parts of the country. These maps will pave the way for larger ventures into the map-making field by government agencies interested in the commercial development of the aeroplane.

P. J. Newmaker, Washington representative, and K. S. Hall of Chicago are making daily trips into the air from Bolling Field for the purpose of surveying the country immediately adjacent to Washington. When their work is completed a map complete in every detail for aerial flight purposes will be drawn up and presented to the Army air service for consideration. Their trips take them as far north as Philadelphia and as far south as Norfolk. The maps will be made on a scale of five miles to the inch.

Propose Blimp Transcontinental Mail Service

The Postoffice Department now has before it a proposal to carry parcel post from New York to San Francisco by "blimps," it was announced recently. A representative of a New York firm who claims to have a type of blimp capable of carrying fifteen tons and able to travel faster than trains is sponsor for the proposal. The name of the firm and its representative are being withheld for the present.

The postoffice has asked for bids for carrying the aerial mail, as was told in Aerial Age recently. Officials of the department have not thoroughly investigated the practicability of carrying the mail in a blimp, but if a bid is made on this basis they say they will consider it. The aerial mail bids which are to be opened September 10 are on the routes from Cleveland to Detroit, Pittsburgh to St. Louis, New York to Chicago, and New York to Atlanta.

Reno Council Accepts Bid for Hangar

Reno, Nevada.—The City Council has accepted the bid of the International Aerial Development Company for the construction of a hangar for the city to be used in the transcontinental aerial mail service.

The hangar will be 100 feet square and will be built of steel and covered with asbestos. Corrugated glass wire windows will occupy one-tenth of the area of the roof.

Railroad Man Acquires an Aeroplane

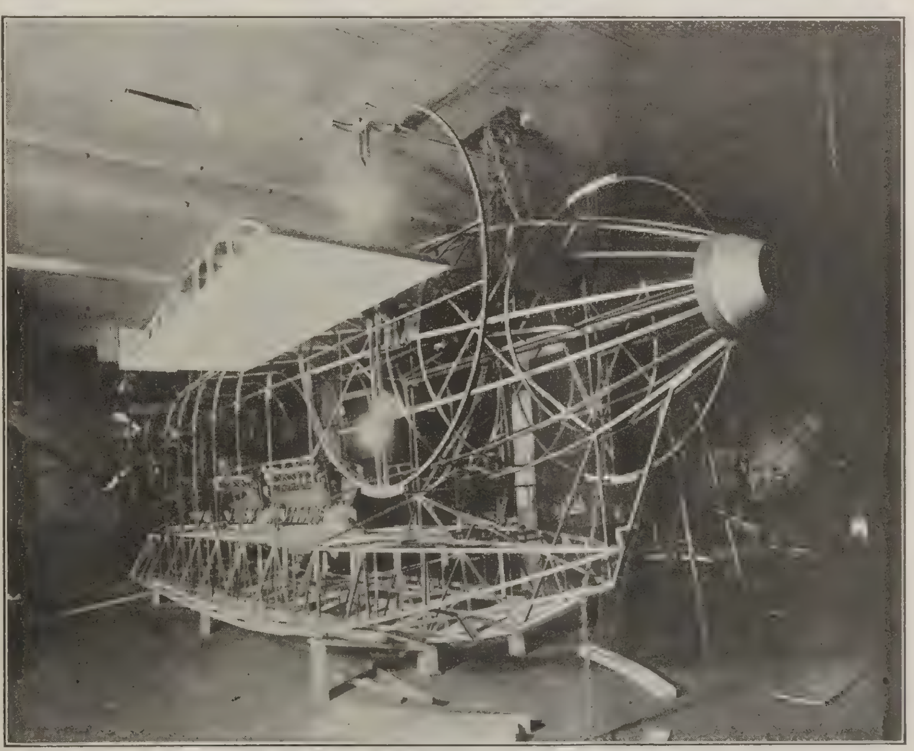
Mr. F. W. Plank, a locomotive engineer on the Great Northern railroad of Whitefish, Montana, is the newest addition to aeroplane owners in the northwest. He has been flying in Glacier National Park since acquiring the machine.

Tandem Monoplane Flying Boat to Carry 10 Tons

What will be the largest flying boat of its type in the world is being built by the International Aerial Navigation Company, of St. Louis, Mo. When completed the big machine will have a carrying capacity, including its own weight, of 26,000 pounds and an air speed of 200 miles per hour. When ready for the air (or water) the structure and motors will weigh about 6,000 pounds, giving a net carrying capacity of approximately ten tons.

To secure a maximum of strength and rigidity with a minimum of dead weight, International engineers conducted a series of tests that resulted in the use of nickel steel tubing for the frame and sheet aluminum for encasing the fuselage. After selecting the materials exhaustive tests were made to determine the strongest joints possible to obtain, as it is necessary to make joints that will withstand vibration as well as tensional strains. The result was the adoption finally of oxy-acetylene welding, which was found, when done with the right kind of apparatus and by expert workmen, to be superior to all other known methods and processes of joining these metals. Oxweld equipment was selected for the work, and a crew of Oxweld operators was employed to do the welding. So far as known this is the first instance in which oxy-acetylene welding has been specified exclusively, in frame and body work, on air-and-water craft.

The accompanying illustration shows the welded construction very clearly and gives excellent views of the two 450-H.P. Liberty 12 Packard aeroplane motors with which the ship is equipped. The fuselage is cigar-shaped, the dimensions being 42 feet long by 8½ feet wide and 9½ feet high. The craft, which is technically known as a Tandem Monoplane Flying Boat, is said to be much stronger and lighter than any other plane having equal lifting surface and power.



Body construction of the Tandem Monoplane being constructed by the International Aerial Navigation Company of St. Louis

The AIRCRAFT TRADE REVIEW

JL Monoplanes for Mercury Aviation Co.

The Mercury Aviation Company of Hollywood, California, has been organized for nearly two years and is operating lines to various points in California from Los Angeles. This company has been able to demonstrate that commercial aviation is a paying proposition and is at present adding on several all metal planes. A service will be established shortly between Los Angeles and San Diego, running twice daily. Outlying points have been brought into much closer touch with Los Angeles in this way.

A. S. M. E. Names Date of 1920 Annual Meeting

The 1920 Annual Meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies Building, 29 West 39th Street, New York City, from December 7th through December 10th.

Sessions will be held on the subjects of Appraisal and Valuation and the Application of Engineering to Woodworking.

The newly founded Professional Sections on Management, Power, Fuels, Machine Shop, Railroads and Textiles will also conduct sessions to consider the vital problems in their field. In addition, a number of valuable papers will be presented at General Sessions.

A memorial session for Dr. Brashear is planned, as a fitting tribute to his life and work.

Navy Orders Aircraft Engines

Washington, D. C.—In pursuance of a policy of encouraging the manufacture of American aeronautical engines, the Navy Department has placed orders with the Packard Motor Car Company for the development and construction of five experimental internal-combustion machines. The engines will be for use in navy dirigibles.

The contract calls for an engine permitting of 100 hours operation at full power without overhaul or adjustment, and of 400 hours' operation at three-fourths load before a major overhaul is necessary.

To Make Fluid to Keep Moisture From Glasses

Arrangements are being completed for the commercial manufacture of Crystal On, a fluid designed to prevent the gathering of moisture on goggles, windshields and other glass surfaces. Crystal On is the invention of Lieut. W. B. Atwater, U. S. N. aviation aid to the commandant of the Sixth Naval District, with headquarters at the navy yard. Rear Admiral Frank E. Beatty, U. S. N., is among those interested in the Crystal On Chemical Company, which will manufacture and distribute the fluid.

Lieut. Atwater and other aviators have experimented with the fluid and the results have exceeded their expectations. Glass surfaces have been kept free of moisture in rain, fog and mist, and Lieut. Atwater and his associates are confident that their fluid will find an enormous market, such a preparation being very much needed, not only by aviators, but by motorists, locomotive engineers and others who need clear glass surfaces.

Aviators who have experimented with Lieut. Atwater's fluid assert that in flights hereafter they will not be without it. They have found by test that it does not freeze at zero, Fahrenheit.

Rear Admiral Beatty, who has recently been relieved as commandant of the Sixth Naval District, is president of the Crystal On Chemical Company; Lieut. William B. Atwater, vice-president; Capt. Charles H. Drayton, secretary and treasurer, and Lieut. J. Frank Morse, manager. Leading business men are interested in the enterprise, the manufactory of which will be located in Charleston, South Carolina. It is confidently expected that the business will be international in its scope and that its volume will be very heavy.

James M. Sprunt of Dillon, S. C., Kenneth Behr, pilot, and H. R. Tucker, Southeastern distributor for Farman planes, leaving Roosevelt Field for Charlotte, N. C. The 750 miles was flown in 10 hours in spite of head winds at a total cost for gasoline and oil of $62.00 whereas the trip North by railroad cost $69.00

U. S. Aerial Express Receives First Seaplane

The first seaplane of the United States Aerial Express Co., which will be put into schedule transportation service between Detroit and Cleveland, reached Detroit at 8.15 A. M. August 13th.

This seaplane left Philadelphia on July 31st, flying to Atlantic City via Cape May, and remained there until August 8th, when the trip was made to New York. New York was left on Tuesday morning, August 10th, and the day's run was to Burlington, Vt. The trip up the Hudson, past Storm King, was made at a few feet altitude. While along the Hudson one of the fast N. Y. C. passenger trains was passed with ease. Just beyond Albany a rain storm was met and while travelling up Lake Champlain a severe squall, with thunder and lightning, was met, but the big plane kept right on. On Wednesday the start was made from Burlington and the first stop was at Monreal, Que., for a short time and then the plane proceeded to Toronto, reaching there late in the afternoon. At Toronto, just as the plane was ready to start on the last leg of its long trip word was received that a banquet for the crew and passengers was ready at the Royal Canadian Yacht Club, which was attended and thoroughly enjoyed by all, and then the plane hopped off for Cleveland, via Niagara Falls, passing over the cataract at a low altitude. Cleveland was reached late in the afternoon and a stop of a few hours made there, and a start made in the early morning for Detroit. On reaching the mouth of the Detroit River a heavy fog had settled and the plane was anchored for the night. The next morning an early start was made and the plane moored at the West Grand Boulevard Dock, which was crowded with spectators, many of whom had been there the night before. After a stop of a few minutes, a party was taken on board and given a sight-seeing trip over Detroit and the waterfront. The great possibilities, capabilities and reliability of the U. S. A. E. Co. planes were shown by this sight-seeing trip immediately after the completion of a 1,600 mile trip, without the plane receiving any attention. Great enthusiasm and interest was shown at every place the big plane landed.

There were no mechanical troubles encountered on the entire trip.

The following is the flying time between the various stopping places on the trip, which, due to atmospheric conditions of low visibility, was longer than necessary due to following the coast lines:

Philadelphia to Atlantic City	1 hr.	50 min.
Atlantic City to New York	1 hr.	8 min.
New York to Burlington..	3 hr.	4 min.
Burlington to Montreal....	1 hr.	20 min.
Montreal to Toronto......	4 hr.	21 min.
Toronto to Cleveland......	2 hr.	50 min.
Cleveland to Detroit......	1 hr.	15 min.

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, General Superintendent, Air Mail Service
Herbert Blakeslee, Assistant Superintendent
John A. Jordan, Chief of Construction

J. Clark Edgerton, Chief of Flying
Charles I. Stanton, Chief of Supplies and Maintenance
Carleton A. Parker, Assistant Chief of Maintenance
George L. Conner, Chief Clerk
John A. Willoughby, Operator in Charge of Radio Experiments

Eugene Sibley, Operator in Charge of Radio Maintenance and Operation

US
AERIAL MAIL

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt
Frederick A. Robinson
Walter J. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris

Duard B. Colyer, Acting Superintendent, New York-Washington Division
Samuel F. Doane, Superintendent, New York-Cleveland Division
Walter H. Riddell, Superintendent, Cleveland-Chicago-Omaha Division
E. W. Majors, Superintendent of Repairs, Bustleton, Pa.
Eugene J. Scanlon, Manager, Air Mail Warehouse, Newark, N. J.
Paul W. Smith, Manager, Newark, N. J.
Maurice J. Kelly, Manager, Bellefonte, Pa.
Howard F. Salisbury, Manager, Cleveland, O.
Andrew R. Dunphy, Manager, Chicago, Ill.
William I. Votaw, Manager, Omaha, Neb.

PILOTS

Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen
Elmer C. Nichols
John J. McLaughlin
Harry Huking
Glenn V. Conrad
Irving Murphy
Claire K. Vance
Homer W. Johnston
William N. DeWald
Clarence C. Lange
William C. Hopson
W. J. McDonough
D. A. Martin

Efficiency Rating of Aerial Mail

An efficiency rating and performance of the aerial mail service during the month of May, 1920, has been compiled by Asst. Postmaster General Otto Praeger, and is one which all connected with the Aerial Mail Service may be proud. The actual performance record of the entire service during May was 91 per cent of possible mileage flown.

The following is the explanation of the percentages in the small tabulations:

Started on Time.—Plane must leave field within 15 minutes of scheduled time to fly.

Completed on Time.—Curtiss R-4 must complete trip at a speed of 75 miles per hour for the elapsed time between take off at initial field and set down on field of destination. Forced landing for gas or oil or any other cause is responsible for the poor showing under this head. The speed requirement for DH4 and Glenn Martin planes is at the rate of 80 miles per hour for the elapsed time between start and finish.

Without Forced Landings.—Means flight is made without interruption for any cause, whether mechanical trouble, gas or oil reservicing, or weather, etc.

Without Damage to Plane.—Means without damage of any character to engine or plane in taking off, landing, taxying or in flight.

Performance Record

Field	Started on Time	Completed on Time	Without Forced Landings	Without Damage to Plane	for Field Average
N. Y.-Wash.	72%	85%	93%	100%	88%
N. Y.-Cleve.	51%	86%	93%	98%	82%
Cleve.-Chi.	77%	65%	71%	90%	76%
Chi.-Omaha	78%	82%	91%	100%	88%

In that period, when 54.693 miles were flown, but two forced landings were made on account of mechanical trouble either with motor or plane. Of the other forced landings, fifteen were due to running out of gas or oil in combating head winds; four of them to weather; and seven of them to new pilots getting off their course and coming down to ascertain their location.

UNITED STATES POST OFFICE DEPARTMENT

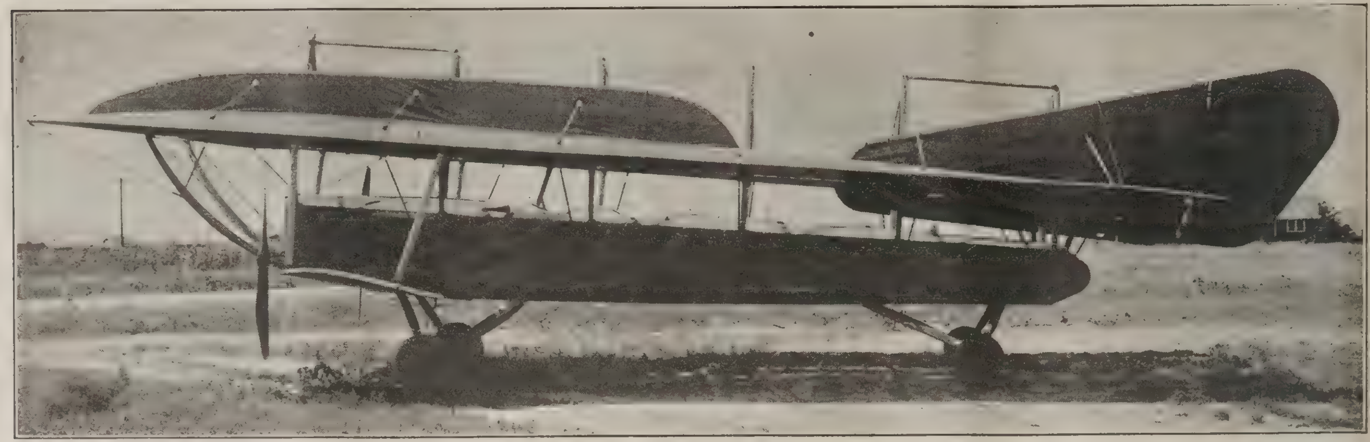
NEW YORK-WASHINGTON ROUTE—AIR MAIL SERVICE

Monthly Report of Operation and Maintenance, May, 1920

Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	SERVICE AND UNIT COST Gallon of Gasoline	Total Time Run hr.	Total Time Run min.	Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
12	$29.68	$6.48	$48.32	$53.12	$19.47	$39.64	$66.19	$31.46	$15.95	$46.24	$73.14	$429.69	106	10	28	585	5.5	$41.05	$0.73
14	31.04	6.40	48.32	53.12	19.47	39.64	36.26	150.70	32.12	46.24	73.14	536.45	108	5	44	407	3.7	93.56	1.32
30	234.36	45.49	48.32	53.12	19.47	39.64	147.56	263.46	100.29	72.50	73.14	1,097.35	837	23	20	2,012	2.4	47.03	.55
31	320.58	41.91	48.32	53.12	19.47	39.64	193.20	211.87	113.10	63.36*	73.14	1,177.71	1,141	30	33	2,777	2.4	38.55	.42
34	75.04	13.56	48.32	53.12	19.47	39.64	56.39	117.01	5.95	25.30*	73.15	526.95	268	8	55	780	2.9	59.09	.68
35	146.14	16.55	48.32	53.13	19.47	39.64	45.11	510.53	2,479.21	72.50	73.15	3,503.75	508	7	08	567	1.1	370.11	6.18
36	244.72	25.10	48.32	53.13	19.47	39.64	131.12	290.21	65.34	72.50	73.15	1,062.70	874	20	44	1,580	1.8	51.25	.67
43	33.60	12.80	48.32	53.13	19.47	39.64	22.13	270.93	18.90	72.50	73.15	664.57	120	3	30	323	2.6	189.88	2.06
49	....	....	48.33	53.13	19.47	39.64	....	117.14	42.12	72.50	73.15	465.48	....	....		....	....	....	...
50	311.68	28.67	48.33	53.13	19.47	39.64	184.34	214.72	40.24	72.50	73.15	1,085.87	681	29	09	2,365	3.4	37.25	.46
51	....	....	48.33	53.13	19.47	39.64	....	78.28	54.03	72.50	73.15	438.53	....	....		....	....	....	. .
80	45.64	3.96	48.33	53.13	19.47	39.64	26.03	30.59	2.95	5.85*	73.15	348.74	163	4	07	390	2.3	84.71	.89
108	12.60	4.20	48.33	53.13	19.47	39.64	6.32	3.31	....	50.00	73.15	310.15	45	1	..	110	2.4	310.15	2.82
109	183.12	7.96	48.33	53.13	19.47	39.64	193.30	175.64	126.44	50.00	73.15	970.18	654	30	34	3,010	4.6	31.73	.32
110	1.40	....	48.33	53.13	19.47	39.64	....	190.53	....	50.00	73.15	475.65	5	....		....	....	....	. .
24227	....	....	48.33	53.13	19.47	39.64	....	153.00	77.10	50.00	73.15	513.82	....	....		....	....	....	...
44301	14.00	2.00	48.33	53.13	19.47	39.64	84.32	48.18	....	35.00	73.15	417.22	50	13	20	860	17.2	31.29	.49
44305	75.04	2.64	48.33	53.13	19.47	39.64	119.39	122.46	9.67	35.00	73.15	597.92	268	18	49	1,055	3.9	31.78	.57
Total	$1,758.64	$217.72	$869.86	$956.29	$350.46	$713.52	$1,311.66	$2,980.02	$3,183.41	$964.49	$1,316.66	$14,622.73	5,828	207	21	16,821	2.8	$70.52	$0.87

Cost per mile, overhead $0.26; cost per mile flying, $0.20; cost per mile, maintenance, $0.41.
Cost of rebuilding one Curtiss R4 plane outside of our service, $1,269.88.
Planes Nos. 12 and 14, Curtiss, JN4H, equipped with Hispano-Suiza 8 motors.
Planes Nos. 30 to 51, inclusive, Curtiss R4, equipped with Liberty 12 motors.
Planes Nos. 80 to 24227, inclusive, De Havilands, equipped with Liberty 12 motors.
Planes Nos. 44301 and 44305, Curtiss JN4D, equipped with Curtiss OX5 motors.
*Indicates that plane appears on another report.

OTTO PRAEGER, Second Assistant Postmaster General



Front view Wisenant Longitudinal aeroplane

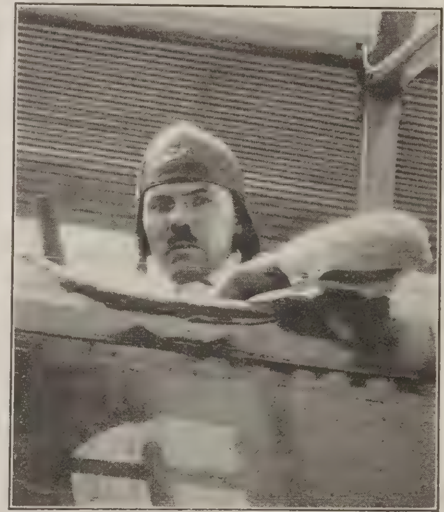
THE WISENANT LONGITUDINAL AEROPLANE

M. A. SPICER

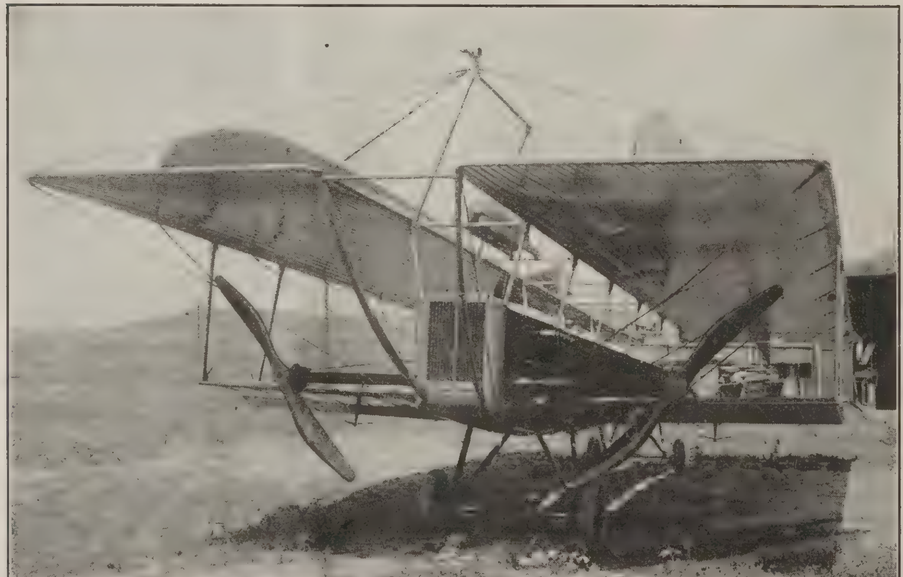
GREAT interest is being created by the longitudinal aeroplane recently built at Colorado Springs by Oscar H. Wisenant. The longitudinal construction is such a radical departure from accepted theories, that in the beginning the inventor had much difficulty in obtaining the financial support necessary for his experiments, but now he is backed by some of Colorado's foremost capitalists. During the war, the work was greatly aided by the War Department, which assumed surveillance and forbade any publicity.

An understanding of the distinctive feature of the new plane can best be obtained from a study of the accompanying cuts. It will be noted that the main panels are placed parallel with the fuselage, rather than at right angles as in all other heavier-than-air machines. The twin propellers, driven by a single engine through a shaft drive and the small panels attached to the lower part of the fuselage directly back of the propellers, will at once strike the aeronaut as something new.

The inventor claims for this construction the advantages of increased lift, speed, stability and ease of control. The cutting down of head resistance by the elimination of struts, wiring and all interference with propeller wash, he argues, will tend to increase speed. The great gliding angle—1 to 28—should guarantee a safe landing in case of engine trouble. He believes its automatic control to be such that it is impossible for the longitudinal aeroplane to go into a nose dive, a tail spin or a side slip; in fact, all tests to date bear him out in this. Longitudinally the center of gravity is well forward, practically the same as in the dirigible.



Oscar H. Wisenant, the inventor



Front view of the Wisenant Longitudinal Biplane

Test flights have been made at low levels with a 90 h.p. Maximotor, using two tractor propellers seven feet in diameter and with a pitch of five and one-half feet. Thus equipped the machine taxied over rough terrain at the rate of 50 miles an hour. A 300 h.p. Hispano-Suiza motor has since been installed, preparatory to speed and altitude tests to be made in the near future.

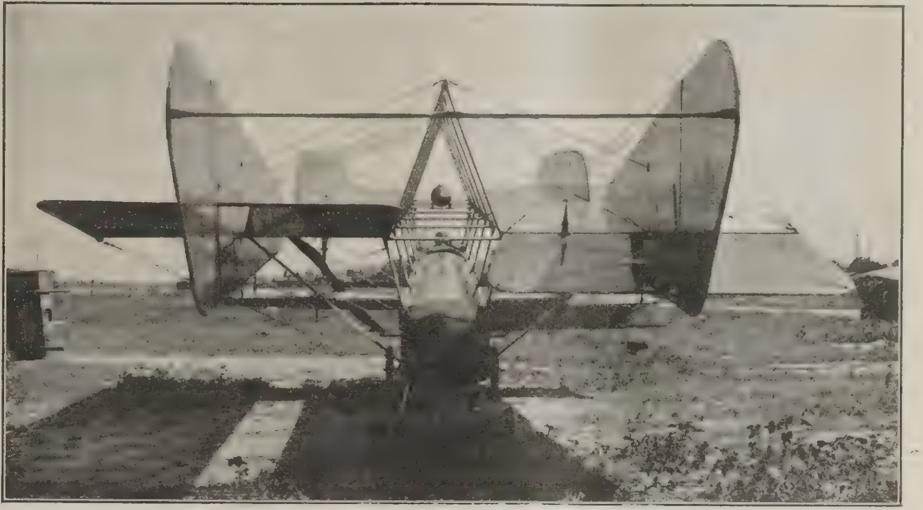
The greater lift has been found to be on the under side of the panels, rather than on the upper side as in the usual crosswise, or bird-shaped, construction. The inventor explains this as due to the fact that the cambered surface of the panels retains the washout, which starts slightly back of the leading edge and is gradually confined along the length of the panel, creating a lift that continues some distance back of the center of gravity. In this way, this style of machine is enabled to climb without noticeably altering its lifting power.

The lift proved to be six to one in a wind tunnel test with a thirty-mile pressure made with a model weighing 16¼ ounces and having two panels each eight by thirty inches. The cambered surface of the panels did not exceed seven-eighths of an inch in depth at the place where the lift was greatest—one-third of the length of the entire panel from the front end. The lift gradually decreased rearward to two-thirds of its length, where it vanished on account of the flattening out of the under surface. The longitudinal center of gravity of this model was below and a trifle in front of the center of lift.

The control of the Longitudinal Aeroplane does not differ greatly from that of the crosswise plane. Lateral and longitudinal balance is maintained by elevators at the extreme rear of each panel. These are controlled by a joystick, the movement being forward and backward for longitudinal control and from side to side for lateral. This sidewise movement causes the elevators to move alternately up and down, for instance, in tipping to the right the stick is pressed to the left, causing the left elevator to go up and the right one to go down, producing practically the same action as the ailerons on the regular crosswise plane. This action also tends to send the machine into a bank. Straightaway steering is controlled by rudders fixed centrally at the rear of the panels and operated in conjunction by means of a rudder-bar.

A separate control is furnished by the two small panels attached to the lower part of the fuselage a little ahead of the center of gravity in the line of force, and having a slight dihedral angle. These small panels are equipped with ailerons controlled by a separate joystick. These ailerons are operated in the same manner as the rear elevators, but not in conjunction with them. One advantage of the small panels is that by lowering their ailerons head resistance may be added, causing them to act as a break in a forced landing.

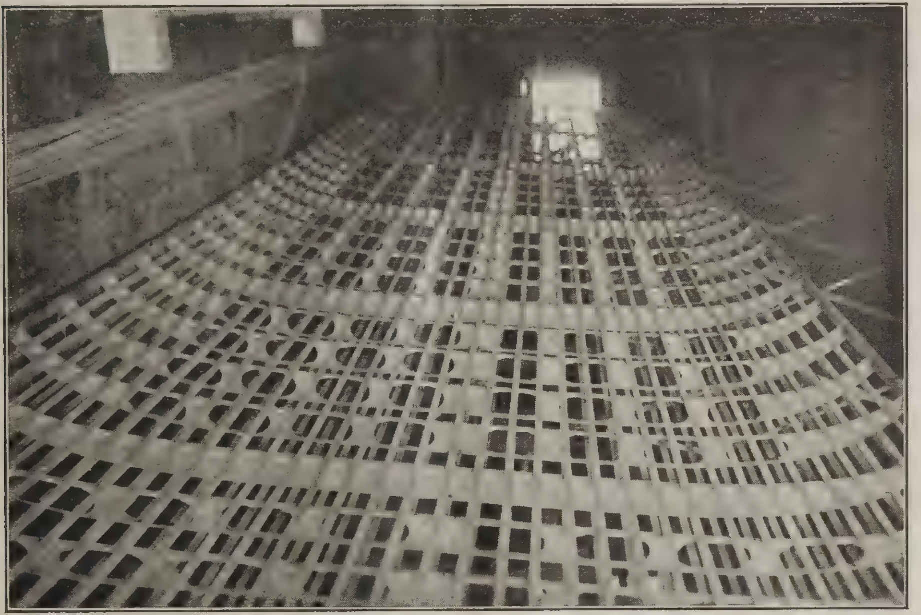
As to the construction of the main panels, the cross ribs are the usual block system. These are attached to side longerons having thin longeron ribs on the top and bottom, spaced two inches apart. The ribs opposite the masts are solid, being laminated of several quarter-inch strips, thus making a firm support for the landing and flying wires to pull against. The small panels are of the usual construction.



Rear view of Wisenant Longitudinal aeroplane

The fuselage construction differs from the usual style in that its four longerons are of angle iron. The inside brackets are the usual type. The fuselage wire bracing is connected to the angle iron longerons. Roebling wire and Atlas wheels are used.

The main panels are attached longitudinally to the fuselage by upright struts, terminating in V-shaped masts. The leading wires are attached to the apices of these masts and to the outer edge of the longitudinal panels. The flying wires are attached to brackets on the under side of the fuselage directly below the masts and to the same brackets on the outer edge of the panels as the landing wires. The lower brackets are in one piece, extending the full width of the fuselage. The fuselage practically hangs in a sling when in flight. This triangular bracing being the strongest known to mechanical science, Mr. Wisenant claims that it will enable the longitudinal plane to flatten out from a steep dive without danger of the panels collapsing. He believes that the narrowness of this type of machine would be to its advantage as a seaplane. The fact that it has no closed view would be in its favor as a battleplane, for this would obviate the necessity of firing through the propeller.



Interior Construction of the Wisenant Wing

BOOK REVIEWS

Exporter's Gazetteer of Foreign Markets: By *Lloyd R. Morris, Research Editor, the American Exporter.*

This is a ready reference guide to the imports and exports industries, shipping, banking, products, climatic and other local conditions of every foreign market.

A unique feature of the arrangement of the work is that all the commercial and industrial statistics and weights and measures have been converted into dollars and into American measurements, so that the business executive can get his facts immediately without going through the process of converting from foreign currencies or measures.

The countries of the world have been grouped in alphabetical order by continents and other major geographical divisions so that adjoining markets are found together.

Under each country will be found detailed information upon area and population, commerce, production and industry, railroads, telegraphs and telephones, money, weights, measures, commercial language, local advertising media, principal shipping routes, customs tariffs, consular regulations and consular representatives, cable rates, mail time, postal rates, and regulations respecting parcel post, money orders and reply coupons. The section under each country dealing with commerce contains tables showing the value of the total foreign trade for a series of years, the value of imports and exports by commodities and countries, and the value of its imports from and exports to the United States for ten or more years.

It is a handsomely bound book of 808 pages and includes a number of charts, a map of the world, a map of the New Europe and line maps of each of the markets.

Obtainable from Aeronautic Library, Inc., 299 Madison Ave., New York City. Price $10.50 postpaid.

Applied Aerodynamics: By *Leonard Bairstow, F. R. S., C. B. E., Fellow and Member of Council of the Royal Aeronautical Society, etc.* With illustrations and diagrams.

A description of the various classes of aircraft, both lighter and heavier than air, and a development of the laws of steady flight on elementary principles. Later chapters complete the detail as known at the present time and cover predictions and analyses of performance, aeroplane acrobatics, and the general problems of control and stability. Methods are described of obtaining basic information from tests on aircraft in flight or from tests in a wind channel on models of aircraft and aircraft parts.

Contents: General Description of Standard Forms of Aircraft, Principles of Flight, General Description of Methods of Measurement in Aerodynamics and the Principles Underlying the Use of Instruments and Special Apparatus, Design Data from the Aerodynamics Laboratories, Aerial Maneuvers and the Equation of Motion, Airscrews, Fluid Motion, Dynamical Similarity and Scale Effects, The Prediction and Analysis of Aeroplane Performance, The Stability of the Motions of Aircraft.

Copies can be purchased at the Aeronautic Library, 299 Madison Avenue, New York City, N. Y. Price $11.00 postpaid.

METHODS OF MEASURING RESISTANCE OF INSULATORS AT HIGH TEMPERATURES

By F. B. SILSBEE and R. K. HONAMAN

(Report No. 53 of the National Advisory Committee for Aeronautics)

Résumé

This report describes in some detail the preliminary experiments which were made on the conductivity of spark-plug insulators in order to develop a satisfactory comparative method for testing various materials. The measurements were made at temperatures between 200° and 900° C., and with both alternating and direct current at voltages as high as 2,000 volts.

The results obtained confirmed the experiments of earlier observers at lower temperatures in indicating a very rapid decrease of resistance with increase of temperature in porcelain, mica, fused silica, and similar materials. This decrease is, however, a gradual one and there is no definite temperature at which the material suddenly changes its properties. The results of conductivity measurements can be most conveniently expressed by stating the temperature (T_e) at which the material has the arbitrarily selected resistivity of one megohm per centimeter cube. Table 1 gives the values of this constant for various substances.

The measurement with direct current showed the presence of disturbing polarization effects which make the apparent resistance of the specimen vary with the magnitude and time of application of the measuring voltage. This effect can be eliminated by the use of alternating current in making the measurements and the later work on a wide variety of substances, the results of which are given in Part II of this report, was done by this latter method.

There is a wide field for further investigation of this subject, as the mechanism of conduction in this class of materials is very complex.

Introduction

The purpose of this report is to describe some measurements carried out at the Bureau of Standards during the past two years on the resistance of various insulating materials at high temperatures. This work was undertaken with a view to studying the relative merits of various insulators for use in spark plugs, and in particular to assist the ceramic laboratory of the bureau in developing improved porcelain bodies for this purpose. The method finally adopted as a result of this work for the comparative testing of materials is described briefly in Report No. 51, Part III, the results of a large number of measurements on a wide variety of materials are given in Report No. 53, Part II, and the development of the ceramic side of the investigation is given in Report No. 53, Part III. The present report will be confined to a description of the various phenomena observed in the experiments which led to the method finaly adopted.

The electrical and thermal conditions under which a spark plug is required to operate differ considerably with the type of gasoline engine used. Measurements with embedded thermo-couples have shown that the temperature of the body of the insulator within the metal shell seldom exceeds 250° C. in water-cooled engines. The tip of the inner end, however, may reach temperatures as high as 900° to 1,000° C. It therefore appeared desirable to study the resistivity of the specimens in the range of temperature between 200° and 900° C.

The electrical stresses applied to a spark-plug insulator by the average magneto or battery coil ignition system used for firing gasoline engines are quite peculiar and difficult to duplicate in any method of measurement. The cycle of operation (see Report No. 58, Part I) following the opening of the primary breaker contacts consists of a rapid rise of the potential applied to the spark plug from zero to a value sufficient to break down the spark gap in the engine cylinder. The breakdown voltage is of the order of 6,000 volts and is reached in a few hundred thousandths of a second. After this a comparatively low voltage (800 volts) maintains the electric arc between the spark points and lasts for a few thousandths of a second. Since the interval between sparks is of the order of 0.1 second, it will be seen that the average voltage applied over a complete cycle is quite low and has been found to be approximately 150 volts. These peculiar electrical conditions should be kept in mind when considering the various methods of measurement describes below.

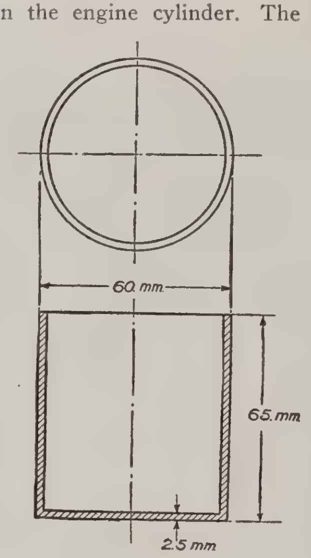


Fig. 1. Porcelain test specimen

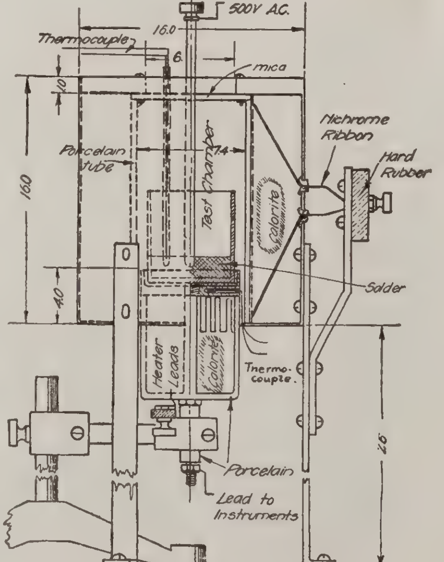


Fig. 2

The materials studied in this investigation included porcelain, glass, steatite, mica, and fused silica, as these constitute the only class of substances sufficiently heat resisting for use in spark plugs. While the detailed studies of polarization, etc., described in this report were made on only a few of the porcelain samples, the same effects seemed to be present to greater or less degree in all cases and the process of conduction is probably similar in all of them. The work of earlier investigators[1] has shown the complex nature of the phenomena, but as yet no complete and satisfactory theory has been worked out to account for them.

Apparatus and Specimens

Most of the work reported in this paper was done on cup-shaped specimens similar to the standard test piece No. 1, adopted by the A. S. T. M., except that the side walls were of uniform thickness. The cross section of this specimen is shown in figure 1. The principal advantages of this type of specimen are:

(1) The conduction takes place through the bottom of the cup, which is of definite and easily measured dimensions.

(2) The large area and small thickness of the bottom insure a relatively large current even with material of high resistivity.

(3) The path over the rim of the cup for any surface leakage is relatively long.

(4) A satisfactory contact can be made between the specimen and the electrodes by immersing the bottom of the cup in a conducting fluid (in these experiments, melted solder) and by inserting some of this fluid inside the cup to form the upper electrode.

These cup specimens were used in the furnace shown in figure 2. The heating coil inserted in the plug below the specimen was found necessary to compensate for the flow of heat through the bottom of the furnace. By proper adjustment of the relative amounts of current through the main winding and through this additional coil, the temperatures inside and outside the cup could be equalized. These temperatures were measured by two copper-constantan thermo-couples, one of which was inserted in a closed porcelain tube which dipped below the surface of the solder in the interior of the cup, while the other was embedded in the steel cup containing the solder below the specimen. Readings of the resistance were taken only when these two thermo-couples showed substantially equal temperatures.

In cases where cup specimens were not available, measurements were made on assembled spark plugs, and also on spark-plug insulators, and on short pieces of

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[1] This Report was confidentially circulated during the war as Bureau of Standards Aeronautic Power Plants Report No. 18.

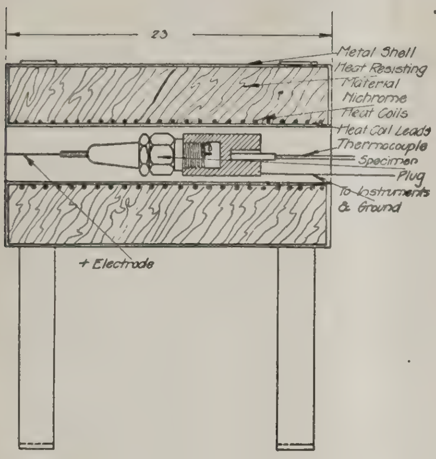


Fig. 3

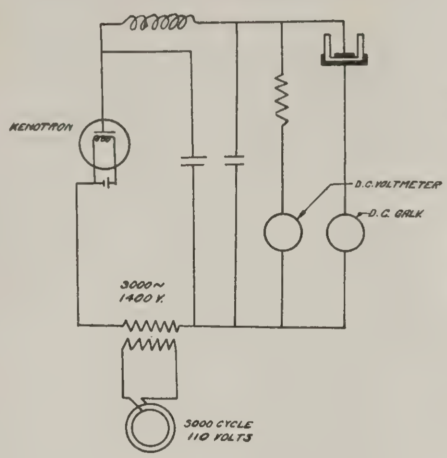
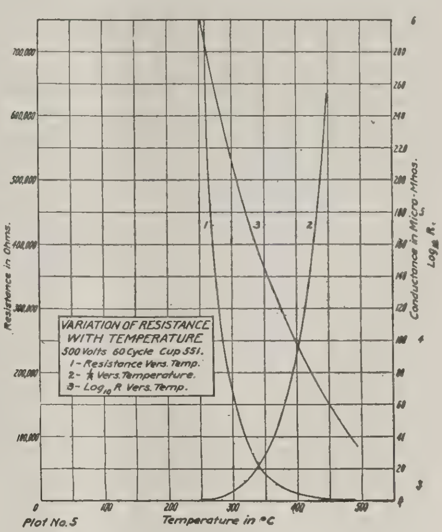


Fig. 4. Connections for high voltage D. C. measurements



Plot 5

tubing. In these cases the conduction took place between a central electrode and either the shell of the spark plug or a band of platinum deposited around the center of the outside of the insulator or tube. The measurements with this type of specimen were definite in indicating the resistance of the specimen, but owing to the uncertainty as to the area of contact and the location of the lines of current flow it is difficult from such data to compute with accuracy the true resistivity of the material.

For specimens of this shape the electric furnace shown in figure 3 was used, and temperatures were indicated by a single thermo-couple placed in an iron plug which supported the specimen.

For reducing the results of either type of specimen from the observed resistance to a basis of the resistivity of the material, the factors connecting these two quantities were computed from the dimensions of the specimens. The resistivity is obtained by multiplying the observed resistance by the factor K, where for the cup specimen

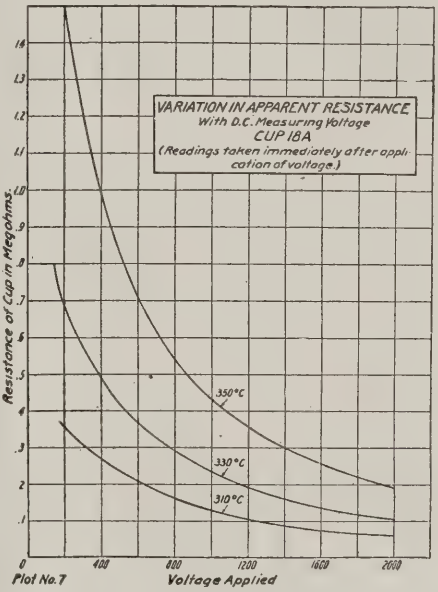
$$K = \frac{\pi d^2}{4t} \qquad (1)$$

and d is the diameter of the bottom of the cup and t the thickness of the cup in centimeters. For the tubular specimen

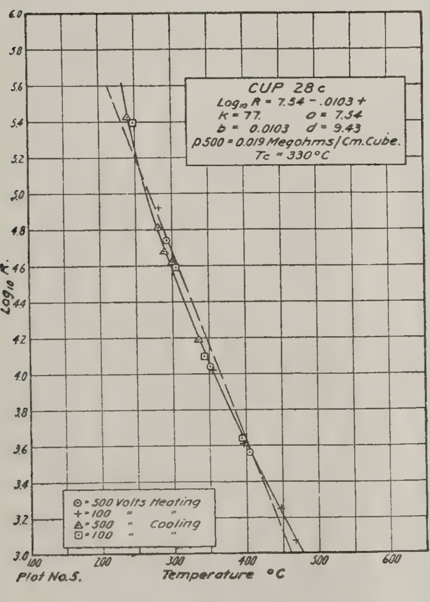
$$K = \frac{2\pi l}{2.30 \log_{10} \frac{R_2}{R_1}} \qquad \text{(approx. 2)}$$

where l equals the length of the external conducting band measured parallel to the length of the specimen, and R_2 and R_1 are, respectively, the external and internal radii of the insulator.

In most of the work the resistances were measured by reading a voltmeter connected across the specimen and an ammeter in series with it and taking the quotient of these values as the resistance. As will be seen from the following, a wide variety of sources was used to provide the applied voltage, and the indicating instruments were correspondingly varied in character.



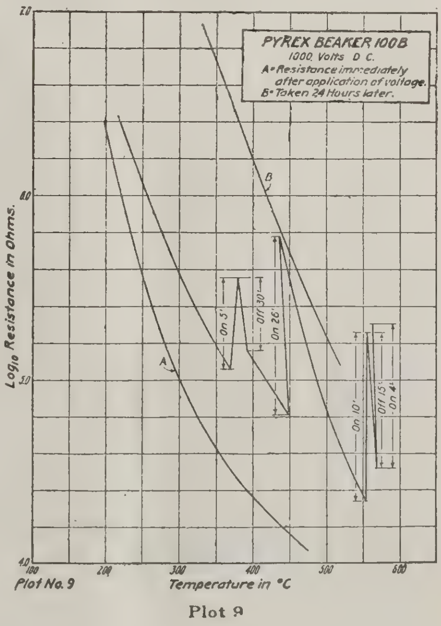
Plot 7



Plot 6

Variation of Resistance With Temperature

The first experiments were carried out with an applied direct-current voltage of about 2,000 volts, which was obtained by rectifying with a kenetron a 3,000-cycle voltage supplied from a step-up transformer. The connections used to obtain this rectification and to reduce the fluctuations in the resulting continuous voltage are shown in figure 4. This rather complicated system was chosen in an attempt to duplicate to some extent the voltages existing in ignition systems, and, although this source of voltage was later abandoned, the data obtained with it brought out the salient facts in regard to this type of conduction. The most striking of these facts, as verified by other measurements made later, is the very rapid decrease in resistance of the specimen with increase in temperature. This variation amounts to approximately 2 per cent per degree centigrade at all temperatures. If the results are expressed by plotting resistance *vs.* temperature, or conductance *vs.* temperature (see plot 5), the resulting curves are so steep as to render it impracticable to express the data over an extended temperature range by a single curve. It is found, however, that by plotting the com-



Plot 9

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[1] Gray, T., Phil. Mag. ser. 5, vol. 10, p. 226, 1180; Haworth, H. F., Proc. Roy. Soc. Lond. A 81, p. 221, 1908; Somerville, A. A., Phys. Rev. 31, p. 261, 1910; Campbell, Nat. Phys. Lab. 11, p. 207, 1914; Kinnison, C. S., Proc. Am. Ceramic Soc. 17, p. 422, 1915; Poole, H. H., Phil. Mag. 34, p. 195, 1917; Brace, P. H., Trans. Am. Electrochem. Soc., May 5, 1918.

mon logarithm of the resistance against temperature as is done in curve No. III, plot 5, and in plot 6 a convenient line of slight curvature is obtained. It will be seen from this plot that if this curvature is neglected, the results can be represented approximately by the equation

$$\text{Log}_{10} R = a - b\,t \qquad (3)$$

This method of expressing the results is very convenient in reducing the data to a basis of resistivity, since combining the relation

$$\rho = K \times R \qquad (4)$$

with equation (3) one obtains

$$\text{Log}_{10} \rho = a + \log_{10} K - b\,t = c - b\,t \qquad (5)$$

In this equation b and c are constants of the material and are independent of the shape and size of the specimen used. Unfortunately, however, the values obtained for one of these constants depends very markedly upon the other, so that a slight error in one will cause a compensating change in the other. They are, therefore, not well suited for comparing the relative merits of the different materials and for this latter purpose it has been found convenient to compute an "effective temperature" (T_e), which is defined as the temperature at which the material has the arbitrarily selected resistivity of 1 megohm per centimeter cube, and which may be computed from the equation

$$T_e = \frac{c - 6}{b} \qquad (6)$$

This value of T_e ranges form 350° in the poorer grades of porcelain up to 800° for fused silica, and is a convenient index of the value of the material as an insulator at high temperatures.

An inspection of these resistance-temperature curves shows a complete absence of any critical temperature at which the material undergoes an abrupt change in its resistance. This shows the error of the commonly accepted idea that porcelain breaks down and becomes conducting at a definite tempearture. This belief probably originated from experiments in which the temperature of a porcelain sample was gradually raised while being continuously subjected to an applied voltage. The effect of the current flowing through the sample in such cases would be entirely negligible up to a certain temperature at which the power $\left(\frac{E^2}{R}\right)$ supplied by the measuring current became comparable with the rate at which heat could be dissipated to the surroundings. Owing to the very rapid rate of change of resistance with temperature, a very slight further increase in temperature would materially decrease the resistance and consequently increase the $\left(\frac{E^2}{R}\right)$ loss. Unless the specimen was in a position to give off heat freely to its surroundings the temperature would rise rapidly, causing a further decrease in resistance, thus leading to an unstable state which would rapidly cause the fusion of the material and the passage of an arc. The rapidity of change of resistance with temperature makes this point of instability quite definite, provided all the conditions of the experiment are maintained constant, but this apparent critical temperature will depend very greatly upon the contact between the specimen and the furnace, upon the applied voltage, and the other conditions, so that this is in no sense a specific property of the material.

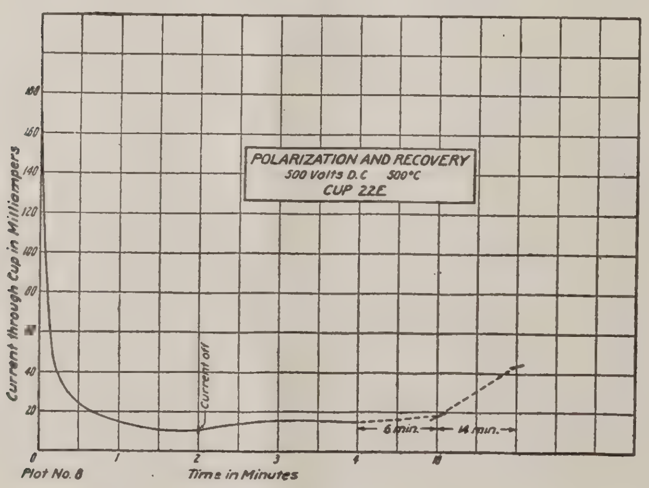
The magnitude of this heating effect is exemplified by the behavior of a porcelain sample tested when hot—for example, at 500° C. At this temperature, the resistance of a centimeter cube of ordinary porcelain is about 100,000 ohms, and if a voltage of only 500 volts per millimeter (*i. e.*, only about one-twentieth of that required to puncture it while cold) be applied, the current flowing will be 50 milliamperes and the power dissipated in the sample will be 250 watts. This will suffice to raise the temperature of the sample at a rate of about 100° C. per second and will cause its rapid destruction.

This heating of the specimen by the measuring current was observed on numerous occasions when making tests at 2,000 and 1,000 volts, and in each case the samples on removal from the furnace were found to contain one or more spots where the porcelain had been fused into a glass by the intense local heating. In the later work at lower voltage this effect was not present, and readings were taken only when the current was substantially constant.

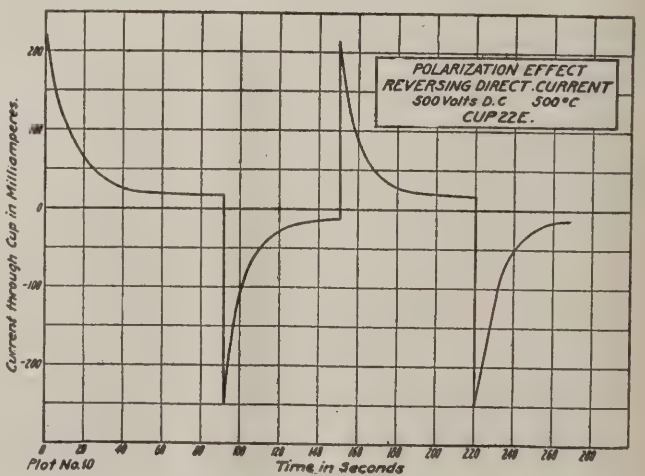
Polarization

The early measurements with high voltage direct current showed a number of puzzling discrepancies, such as a variation of the apparent resistance with the voltage used in making the measurement and with the time of application of this voltage. Plot 7 shows this variation of resistance with voltage as observed with a porcelain cup specimen. Such discrepancies indicated the presence of an additional phenomenon to be reckoned with, which in the absence of definite knowledge as to its origin was called "polarization," and will be so referred to throughout this report.

The fundamental manifestation of this so-called polarization is that if a constant direct-current voltage be applied to a specimen, the resulting current will decrease at first rapidly and then more gradually, as is indicated in plot 8. The reduction in current is often equivalent to an increase in resistance by a factor of 10 or 20. If the specimen is allowed to remain at a high temperature but without applied voltage for some time, the effect gradually disappears, but a considerable time is required to accomplish this. The disappearance is more rapid at high temperatures than at low. Plot 9 gives a record of the variation of the apparent resistance of a glass beaker, as measured with 1,000 volts direct current, after various applications and removals of the measuring potential. The course of the experiment is indicated by the arrows, and the duration of each period of application or of rest is indicated on the curve. The lowest and highest curves give the resistance as observed with very short application of the testing voltage just prior to the polarizing test and on the following day, respectively. The apparent permanent increase of resistance observed with this specimen serves to explain some mysterious results obtained at an earlier date, in which one specimen had shown an increase of resistance to more than twenty times its initial value after several successive tests. The fact that an appreciable time is required to obtain a reading, even with quick acting direct current indicating instruments, and that during this time the specimen is being polarized, is probably a complete explanation of the variation of apparent resistance with applied voltage, shown in plot 7. If the applied direct-current voltage is suddenly reversed after a specimen has become polarized to a considerable extent, the initial current in the new direction is found to be approximately equal in magnitude to the original current and much greater than the value immediately preceding the reversal. (See plot 10.) This implies a counter E. M. F., and an attempt was made to observe such an effect by connecting an electrostatic voltmeter across the specimen. No residual deflection of this meter was observed when the supply current was removed, even after long-continued polarization of the specimen. This result is to some extent in contradiction to facts mentioned by other observers.[2]



Plot 8

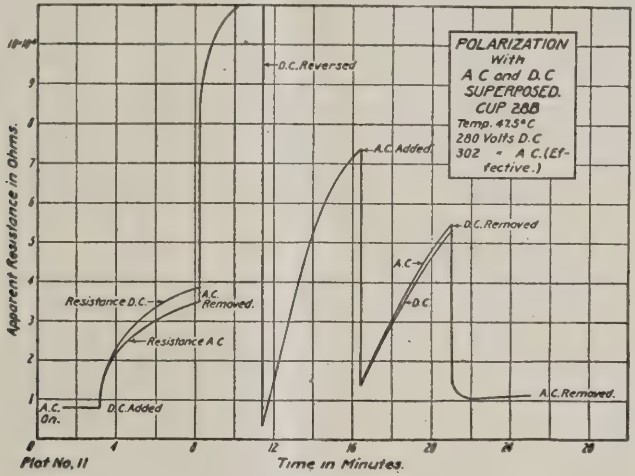


Plot 10

A magneto having alternate distributor points of the same polarity connected together was also used as a source of voltage and the polarizing effects found to be in every way similar to those obtained with a steady direct-current source of the same average voltage (150 volts).

When alternating current is applied to a fresh specimen, there is no polarizing effect and the current remains constant indefinitely, except when the current is so large as to produce heating of the specimen. When alternating current is applied to a specimen which has been previously polarized by direct current, the polarization disappears at a more rapid rate than if the alternating current had not been applied.

An attempt to throw light on these complex phenomena was made by applying alternating and direct current simultaneously to a specimen. This was accomplished by connecting a transformer in series with a generator. By opening the primary circuit of the transformer, or the field of the generator, either source of E. M. F. could be eliminated without opening the circuit or interfering with the current flow from the other source. The alternating-current voltage was measured across the transformer terminals with a moving iron voltmeter, and the direct-current voltage by a d'Arsonval type direct-current voltmeter across the generator. The alternating current through the specimen was passed through the moving coil of an electro-dynamometer, the fixed coil of which was excited by an alternating current of constant magnitude and in the same phase as the alternating voltage applied to the specimen. The direct current through the specimen was measured by a direct-current milliammeter connected in series with the specimen and the dynamometer. With this arrangement, each pair of instruments measured only its particular component of the resultant current and voltage and was not affected by the presence of the other component. Plot 11 shows the variation with time during the course of the experiments of the resistances as computed from the two components of the current. In this experiment the maximum value of the alternating-current voltage was greater than the direct-current voltage, so that the resultant voltage applied to the specimen reversed in sign during each alternation. Other experiments, in which the maximum alternating-current voltage was less than the direct-current voltage, and the resultant voltage was consequently unidirectional, showed substantially the same effects.



Plot 11

Throughout the experiments the temperature was held as nearly constant as possible, but a gradual drift of resistance will be noticed which can be accounted for by a slight change of temperature. It appears from these results that the resistance of the specimen is substantially the same for both the alternating and direct current for all states of polarization. Or, in other words, the polarization produced by the direct current offers resistance to the passage of the alternating current and the depolarization produced by the alternating current reduces the resistance offered to the passage of the direct current.

When alternating current alone was applied to a fresh specimen, the power factor of the circuit was found to be substantially unity. If, however, the specimen had recently been polarized by the application of direct current, the power factor was somewhat reduced; values as low as 0.9 having been observed.

The data described above are quite insufficient for the development of any complete theory of this polarization, but it would appear that the assumption of a counter E. M. F. is ruled out both by the experiments of combined alternating and direct current and by the difficulty of imagining a mechanism capable of producing a counter E. M. F. of the order of several thousand volts, which would be required to produce the observed decrease of current. A possible explanation may be developed on a basis of the migration away from one electrode, of the ions carrying the current, thus leaving a scarcity of carriers for the further passage of current in the original direction, but providing a plentiful supply for currents in the reversed direction. Another suggested explanation is the formation of resisting films which may cover a considerable part of the area of the electrodes but which are readily removed by electrolysis on reversal of the current. Tests made using platinized surfaces as electrodes instead of the melted solder showed no difference of behavior. It may be noticed in this connection that when the samples were removed after cooling, the solidified solder adhered firmly to both surfaces of the cups which had been treated with direct current, but could be very readily peeled off from specimens which had been tested on alternating current.

Discussion of Methods for Measuring Resistances

As a result of the data obtained in the preliminary experiments just described, it was decided to adopt as the most satisfactory method for the rapid comparison of different types of insulating materials the volt-ammeter method, using alternating current. Under these conditions the observed resistance is substantially independent of the frequency, voltage, and time of application, and the convenient values of 60 cycles and 500 volts were adopted for the later work. Plot 6 shows typical results obtained by this method and indicates the agreement attainable on successive runs even at different voltages. It should be remembered, however, that the results thus obtained are for the material in the unpolarized state, and, when in actual use in ignition systems, the material may show a much higher resistance to the unidirectional impulse from the magneto.

A method involving the measurement of the rate of loss of charge from a condenser connected in parallel with the specimen has been used by Cunningham. This method imitates the conditions of operation much more closely than does the alternating current method, but not as perfectly as the use of a magneto as a source. The principal objections are the very delicate string electrometer which is required and the necessity of recording the results photographically.

Typical Results and Conclusion

The following table gives the results obtained by the use of the alternating current method on a number of types of samples, the significance of the various constants being the same as those defined previously.

TABLE 1.

Material	C	b	T_e °C	ρ at 500° C.
Fused silica....	11.8	0.0065	890	340.10^6
Best porcelain tested	11.2	.0066	790	80
Typical mica plug	12.1	.0085	720	70
Average of three aviation porcelains ...	11.5	.0085	650	40
Average automobile porcelain	10.2	.0085	490	.80

These figures show a wide variation in the resistance of the different materials but a rather surprising similarity in the constant *b*, which is a measure of the temperature coefficient of their resistance. It should be mentioned in this connection that while successive measurements with alternating current on a single specimen give results repeating to a few per cent, yet measurements on different specimens of material which are supposed to be identical show wide variations in resistivity, amounting in some cases to a factor of 10. This fact tends to indicate that the conduction is due to a considerable extent to the presence of small amounts of impurities which may vary greatly in amount without appreciably affecting the composition of the material as a whole.

It appears from the above data that the alternating current method developed is very practical and convenient for comparative measurements on samples of this character, but there is a very wide field of investigation concerning the phenomenon of polarization and much interesting work may be done in developing theories as to the precise mechanism by which conduction is carried on in this class of materials.

(*Continued from page 797*)

established organizations to carry out the above mentioned purposes and advance the science and art of aerial navigation.

Becomes Largest Aeronautic Body in the World

Affiliated with the Aerial League of the World are the sixty committees and commissioners throughout the world, the Pan-American Aeronautic Federation, which was founded in 1915, and directs aeronautics in South and Central America; the Aerial League of America, which is the largest aeronautic membership organization, having 6,000 members; The Aerial Touring Association, which specializes in aerial tours; the Aerial League of Cuba; The National Aerial Coast Patrol Commission, of which Captain Robert A. Bartlett, the famous explorer is chairman and which was responsible for the organizing of the Aerial Coast Patrol Units in 1916-1917, which gave 200 trained naval aviators to the U. S. Navy when the United States entered the war; The Associated Aviation Clubs of Ohio; the Aerial League of the Pacific Slope; the Aero Club of Southern California, and other aeronautic organizations."

Major Charles J. Glidden is the President of the Aerial League of the World and the Vice-Presidents and Directors include the following leading aeronautic authorities: Alberto Santos-Dumont, Henry Woodhouse, K. M. Turner, president of the Aero Club of Southern California; Col. R. S. Hartz, Vice-President of the Associated Aviation Clubs of Ohio; Capt. R. A. Bartlett, Chairman National Aerial Coast Patrol Commission; Major Wm. A. Scully, Lieut. Ralph Kiely, former Secretary of the American Aeronautic Delegation to the Peace Conference; Hon. Murray Hulbert, member Board of Directors of Aerial League of America; Commander Ferderick H. Allen, former member of American Delegation to the Peace Conference; Hon. E. Lester Jones, Director U. S. Coast and Geodetic Survey; Major A. B. Lambert, president Missouri Aeronautical Society; Col. Bion J. Arnold, Chairman Chicago Air Board; Lieut. W. B. Atwater, USNRF; Lieut. Raffe Emerson, USN, dirigible balloon expert; George M. Myers, President Aero Club of Kansas City; John Hays Hammond, Jr., Brig. Gen. R. K. Evans, USA (retired); Major Reed G. Landis, Edw. Stafford (son of Judge Stafford and son-in-law of Admiral Peary), Brig. Gen. T. C. Lyster, USA (retired); Col. I. H. Jones, USA, formerly of Air Medical Service; Major Thomas S. Baldwin, Major Loring Pickering, Commodore Louis D. Beaumont, and Benjamin Hillman.

The Honorary Commissioners and Chairmen of Committees for different countries are as follows: Arabia, Hormusjee Cowasjee Dinshaw, MVO, OBE; Argentine, Alberto R. Mascias; Belgium, Fernand Jacobs, Lt. Becquet; British Columbia, Capt. C. H. Nicholson; Brazil, Dr. M. DeLacerda, Alberto Santos-Dumont; Burma, E. J. Holbertson, CBE; Celebes, The President of Takassar Racing Club; Chile, Jorge Matte; China, Dr. J. C. Ferguson, Miltotn O. Clark; Ceylon, B. W. Leefe; Costa Rica, Oscar Sitttenfield; Cuba, Dr. Ricardo Dolz; France, Dr. A. L. Hipwell, Paul Tassandier, Andre Michelin, Sidney B. Veit; Great Britain, Sir George Fisher Smith; Hawaii, W. F. Dillingham; Hongkong, Mr. S H Dodwell; Italy, President and Secretary of Aero Club d'Italia; Indo China, Louis R Gage, Austin O. Glass; India, Capt. R. H. Gunning, A. H. Froom, A. R. Murray, J. F. Simpson; Japan-Corea, E. W. Frazar; Peru, Senor Juan Leguia; Macao C. E. W. Ricou; Malaya, Mr. Wm. P. W. Ker, Charles H. Henderson; New Zealand, J. Allen; Netherlands, M. H. Damme; Philippines, Hon. Manuel L. Quezon; Porto Rico, Geo. L. Dedrick; Quebec, Hon. Frank Carrel; Siam, Hon. F. W. Sowers; Switzerland, Major Emile Messner; Turkey, Abdul Hamil Bey; Uruguay, President of the Centro Nacional De Aviation.

Temporary headquarters of the Aerial League of the World have been established at 280 Madison Avenue, New York City, pending the selection of a suitable Club House.

SPECIAL MEETING OF A. C. A. TO BE HELD AUGUST 28th

THE request to hold a special meeting of the Aero Club of America, signed by over forty members, which was first presented to the eight governors of the club at the meeting of August 4, was filed by Major Charles F. Glidden with the Secretary of the Club on August 14. The request calls for a special meeting to be held on August 28, at the Club House, 297 Madison avenue, New York City, at ten o'clock in the forenoon.

The purposes of the meeting are stated in the proxy form, as follows:

"I, the undersigned, a member of the AERO CLUB OF AMERICA, believing that in justice to the members of the Club, and to safeguard the Club's best interests, and in compliance with the Membership Corporation Laws of the State of New York, the members of the Aero Club should be given a fair opportunity to consider in detail and vote upon separately, by ballot, on the many changes proposed in the Constitution and By-laws of the Club, and the proposed plan to assume the lease and operation of the American Flying Club, which is known to have caused a deficit of over $50,000 during the past year to that Club; and believing, further, that the proposed changes and extensive financial obligations which it is proposed to assume should be submitted to the entire membership with adequate explanation of the purposes of said proposed changes and projects and a detailed statement showing clearly how it is proposed to meet the new large financial obligations to be undertaken in connection with the proposed changes of quarters; and believing, further, that during the vacation season, when a large percentage of the members are away, it is not possible to insure the serious and adequate consideration which should be given to this matter by the whole membership of the Club in less than sixty days from date of mailing the said information to members; and in view of the fact that the regular annual meeting of the Aero Club of Amerca is to be held on November 8, 1920, and it would save time and efforts and the cost of extra printing and postage to have these vital questions submitted to the members in connection with the notices of the annual meeting; hereby constitute and appoint Charles J. Glidden, Captain Robert A. Bartlett and Brigadier General Robert K. Evans, U.S.A., or either of them, my attorneys and proxies, in my name, place and stead, with power of substitution, to act for me and in my name and as my proxy at a Special Meeting of the Club to be held on the twenty-eighth day of August, or on such other day or days as the meeting may thereafter be held by adjournment or otherwise, hereby granting my said attorneys and proxies, or either of them, or their substitute or substitutes, full power and authority to act generally for me and in my name at the said meeting or meetings, and to vote thereat in my name, or otherwise, in the transaction of such business as may come before the meeting, as fully as I could do if personally present, and expressly to vote in favor of postponing all action on the proposed amending or rescinding of the present Constitution and By-laws and the adoption of a new Constitution and By-laws, and on the proposed plan to make the Aero Club assume the large financial obligations of leasing and operating the American Flying Club House, expressly ratifying and confirming all that my said attorneys and proxies, or either of them, or their substitute or substitutes, may do in the premises. And I hereby appoint my said attorneys and proxies, or their substitute or substitutes, as my agent to affix hereto such Revenue Stamp as may be required by law."

The irregular meeting called for August 16 by a few individuals who have obtained temporary control of the club, was held and these individuals, by using the five hundred proxies which they had obtained by the questionable methods exposed, the statement signed by over forty members of the club, printed in AERIAL AGE for August 16, and suppressing the flood of written protests of members, claimed the authority to carry out their schemes.

At present there are two actions in the Supreme Court. The first action was instituted by Mr. Woodhouse to obtain a permanent injunction against merging of the Aero Club of America and the Flying Club. Pending the trial of this action Mr. Woodhouse asked for a temporary restraining order but this temporary order was denied by Justice E. P. Glennon on August 9. The action will now be prosecuted to trial diligently and when the trial takes place the Court will have the benefit of actually examining the Exhibits and interviewing the witnesses personally, which could not be done on the motion for temporary restraining order.

The second action was the application for the Writ of Mandamus made to the Supreme Court by Mr. Woodhouse and argued before Justice Burr on August 9. The Judge reserved decision.

New actions are contemplated by governors and members. They will be based on actual violations of the membership corporation law of the State of New York, Sections 7, 11, 13 and 14, based on the actions proposed to be taken by the few individuals, following the meeting of August 16.

NAVAL and MILITARY AERONAUTICS

Army Aeroplanes Reach Alaska

Ketchikan, Alaska.—The four army aeroplanes which left Mitchel Field, Mineola, Long Island, on July 15, on a flight to Alaska, have landed at Wrangel, Alaska. They came to ground on the flats of the Stikine River, seven miles from the town.

They are the first heavier-than-air machines from the outside to land in the Territory of Alaska. The only other plane ever seen here was a small exhibition machine, carried by boat to Fairbanks, in the interior, in July, 1913. This gave only brief display flights.

The weather was favorable, and the four machines made perfect landings. The aviators had not yet come to Wrangel, as they were busy caring for their machines. From Wrangel the fliers intend to go to Dawson, Fairbanks, Ruby and Nome, and the Weather Bureau predicts that they will have good weather, which is usually favorable at this season of the year.

New Duties for Air Service Officers

For purpose of supervision of Air Service activities not under the direct jurisdiction of the department commanders, and for convenience and closer coöperation with activities of the Army as a whole, the Chief of Air Service is authorized to have a special representative of his office in each of the territorial departments, who will be stationed at the headquarters of the department, and whose relationship to the Chief of Air Service on Air Service matters, pertaining to the units, organizations, establishments, special Air Service projects, etc., exempted from department commanders by G.O. 132, W.D., 1919, is similar to that of department Air Service officer to the department commander. The department Air Service officer is designated as this special Air Service representative and in addition to his primary functions as a staff officer of the department commander, he will perform such duties in connection with the Air Service of the Army as a whole as may be required.

Coast Guard Gets Life-Saving Seaplanes

At the Coast Guard aviation station, Moorehead City, N. C., four seaplanes are being assembled and will be tested for rescue work in the stormy season during September and October. Two planes are now in commission and are used for patrol work along shore and for photographing sand bars and other underwater obstructions to navigation in the vicinity of the station. The commanding officer of the station is Captain of Engineers C. E. Sugden, who commanded the station at Ile Tudy, France, during hostilities, several officers of which were decorated by the French government for their bravery and skill in sinking submarines.

The method to be employed in life-saving by seaplane will be the carrying of lifelines to a foundering ship; the lines will be weighted and cast from the planes a short distance from the off-shore side of the ship, then the plane will pay out line across the ship and carry it to the beach, where it will be weighted and dropped to the life crews who man the reel and handling gear.

Heads N-C Plane Division

Lieut. Commander Henry B. Cecil, at the naval air station, Pensacola, Fla., has been assigned to the command of the Atlantic N-C plane division.

Aerial Combats at Olympic Games

In connection with the Olympic Games this year in Antwerp, Belgium, an aviation fete is to be held to which members of the different allied armies have been invited to attend.

The following is quoted from the program of events and gives an indication of the tournament in which military aviators will be permitted to participate. Dates of games to be published later.

This event will simulate the battle of one plane against another by two planes. The accuracy of the fire will be determined by means of machine gun photographs.

The event is open to all military aviators of the allied nations or their associates still under arms or demobilized. Each nation will be represented by four planes, two single-seaters and two two-seaters, and as a team, one single-seater and one two-seater. Only aeroplanes constructed by allied countries or associates will be admitted in the event. The pilots of the winning outfit will receive the Aero Club of Belgium medal.

A program made in the presence of one of the delegates of each nation participating will fix the order of combat and will designate the opponents he will have to combat. The fight will take place single-seater vs. single-seater, biplace vs. biplace. Two entries from the same country will not be able to fight against each other.

The mock combat will be carried on as follows:

The opponents will take the air at given signals and immediately proceed to circle a point previously designated to each respectively. The signal to commence fight will be given after five minutes and will be made by a Very's light.

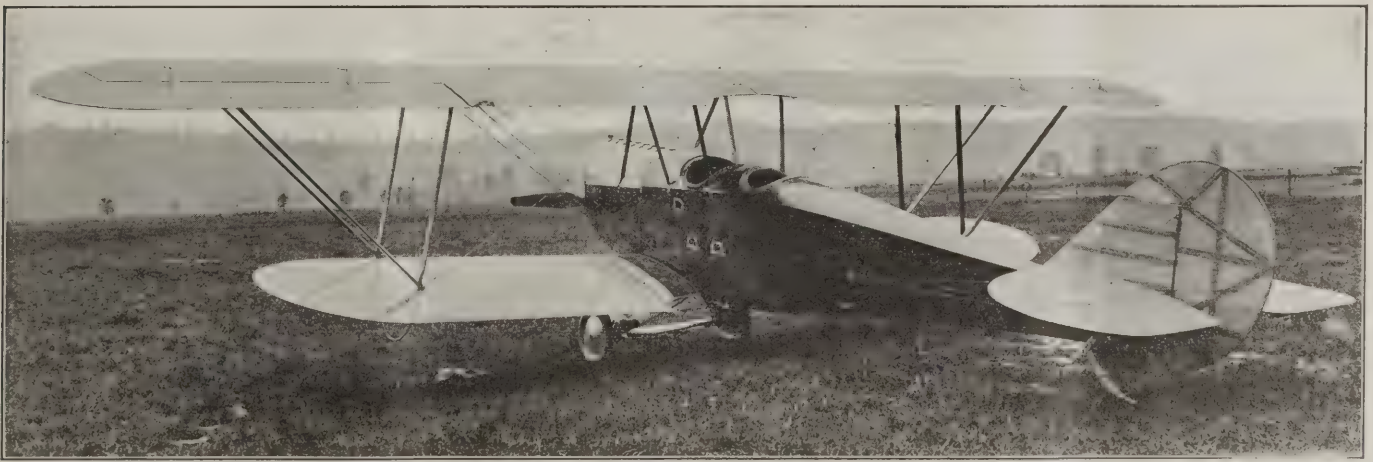
At this moment the contestants will engage in combat which should take place between 500 and 1000 meters above a zone and within the perimeter of a circle to be indicated to contestants beforehand.

During the combat the opponents must take by means of the photographic gun camera eight snaps according to special instructions.

The fight will last ten minutes and will be indicated from the ground by means of Very's light, at which signal the contestants will as soon as possible land at the turning point.

Any contestant who has taken his eight photographs before the ten minutes are up cannot leave the combat zone before the signal "combat ended." The same applies to anyone who has a gun stoppage.

If motor trouble or other machine failure causes a contestant to land before the signal, his team mate will take over the combat with the same opponent to complete combat time so interrupted. The snap-shots taken by the contestant and his team mate will not in any case exceed eight in number. In the combat of the two-seaters the photographs must to taken by the observers' guns.



Boeing aeroplane in which Pilot H. Munter and two passengers recently crossed the Cascade Mts. on a flight from Seattle, Wash. to Portland, Ore.

FOREIGN NEWS

70,000 Passengers Record of First Year of Civil Flying in England

London.—With 38,954 flights and a total of 70,000 passengers carried during the first year of civil flying in England, there was but one fatal accident. Announcement of this, made at the international aero show, caused much comment and led Comptroller General of Civil Aviation Maj. Gen. Sir F. H. Sykes to say:

"We have conquered the air, and our immediate task is to exploit our victory in the interest of commercial development."

The number of miles flown was 734,200 for the first year and goods carried totaled 116,498 pounds. Up to the end of March, more than £200,000 worth of imports and exports were carried by air between the United Kingdom and the continent.

A total of 114 aerodromes were licensed and 519 machines were registered during the first year of civil flying in England.

Plan to Market New Type of Hydro-Aeroplane

Paris.—A new type of hydro-aeroplane, operated by three helices, has been completed, and will be marketed soon by Jean Latham, son of Hubert Latham, who, two years before the war, met his death while hunting in the Kongo. Scientists here prophesy that the invention will facilitate exploration work in the interior of France's colonies, as it combines three great factors—speed, carrying power and comparative lightness of equipment, and is able to use the smallest streams in case of forced landings.

The cabin contains room for four passengers, as well as compartments for reserve supplies. All the machinery is above the heads of the passengers. In trial tests, the hydro-aeroplane, carrying thee tons, mounted half a mile in 4 minutes, a mile in 8 minutes, and three miles in 34 minutes. The speed test showed a maximum of 100 miles an hour, which was easily attained.

Germany Has 25 Air Transport Companies

Progress in civil flying made by the various countries of the world since the armistice is discussed in a detailed report just made public by Sir Frederick Sykes, controller general of civil aviation in Great Britain.

Despite the fact that Germany, Austria and Hungary are forbidden, under the terms of peace, to manufacture or import aircraft engines, the report points out that these three countries are in process of organizing departments of government to deal with civil aviation. At the present time, Sir Frederick says, there are twenty-five aerial transport companies in Germany, and the number is increasing monthly.

Shortage of fuel and the general chaotic economic situation are retarding aviation in Austria, says the report. Belgium has organized an air ministry and has established air attaches in Paris and London. The government, it is said, has appropriated 2,000,000 francs for development of flying in the Belgian Kongo

Great progress is recorded for France, which has air attaches in all the chief capitals of the world, whose duty it is to study the aviation in various countries.

France, he says, has acquired five aerodromes and twenty-four landing grounds for the use of civilian flying and is also planning to connect all her colonial possessions by airlines.

Italy has appointed sixteen air attaches in as many countries, says the report, and is spending large sums of money in order to keep herself in the front rank of aviation development.

The Toulouse-Rabat-Casablanca

The Toulouse-Rabat aerial mail service has now extended its line to Casablanca, which is for the time being to be the southern terminus of the route.

A Franco-Roumanian Flying Company

A company, known as the Compagnie Franco-roumaine de Navigation Aérienne, is in the course of formation with an initial capital of 3,000,000 francs. The company's office is at 194 due de Rivoli, Paris. The first line to operate will be from Paris to Prague. This route will later be extended to Bucharest and to Constantinople.

Lieutenant de Fleurieu, a director of the company, who with Captain Deullin made some months ago a flight over the route Paris-Prague-Warsaw, intends to organize a regular aerial line between those places.

The machines to be employed are S.E.A. Potez, of limousine type, which under official observation have flown at a speed of 126 miles an hour.

The "L.72" in France

As in London, so in Paris, a demand has arisen for a sight of the captured Zeppelin, and the French authorities have decided that when the shed at Cuers, where the "L.72" is to be permanently stationed, is ready, the airship will cruise over Paris on her way from Maubeuge. The French Minister of Marine and M. Flandin, Under-Secretary of State for Aviation, visited Maubeuge to inspect the airship, which is similar to the "L.71" delivered to England. The dimensions of the "L.72" are: Capacity, 69,000 cubic m.; length, 226 m.; diameter, 24 m.; total height, 28 m. The airship has six *nacelles,* two axial and four lateral, each containing a 260-h.p. motor. Useful load, 41 tons; maximum speed, 120-125 kiloms. per hour; radius of action, about 18,000 kiloms.

Lieut. Roget at Athens

Completing another stage of his flight round Europe, Lieut. Roget arrived at Athens on July 17.

French Speed Range Competition

When the competition for the "Grand Ecart" (greatest speed range) prize of 10,000 francs, offered by *L'Auto,* concluded on July 15, the best performance had been made by Bossontrot on a Farman Sports Biplane, and he therefore secured the prize. His winning performance, made on July 1, was minimum speed 23.411 kiloms. per hour, and maximum speed 139.896, giving a ratio of 5.9753. Second place went to Ed. Pillon, also on a Farman Sports model, with a ratio of 4.5980, and third to Casale, on a Spad-Herbemont, with 3.5276. In the landing competition the best performance was Pillon's 16 m. 60, Bossontrot's best being 19 m. 75 and Casale's 126 m. 15.

Civil Aviation in France

Before starting off by aeroplane for Antwerp on July 19, M. Flandin, the French Under-Secretary for aviation, gave some interesting details as to progress in France. No new military machines are being constructed, but old ones are being transformed and modernized. The production of civil machines is being intensified, it being realized in France that a large reserve of pilots must be retained. In addition to the three regular lines now running to London, Brussels and Geneva; a new one—Paris-Deauville—will shortly be started. Good progress is being made at the new air port at Orly, south of Paris, which will presently relieve Le Bourget. At Orly there will be accommodation for airships including those of the Zeppelin type. M. Flandin prophesied a big development of postal and passenger traffic, and said a number of new aerodromes are being arranged.

Aerial Navigation in France

A decree signed by the President and published in France on July 14 brings that country into line in connection with the International Air Convention. It prescribes that machines of other countries which have signed the convention may fly over France, with the exception of certain military areas, and aircraft coming from abroad must also keep to certain routes which will be subsequently defined. The rules and regulations regarding certificates, logs, licenses, etc., are now being drawn up and they will be published shortly.

Aero Service between London and Brussels

The successful inauguration of the aerial mail service between London and Brussels, the contract for which has been secured by Messrs. Handley Page, took place recently. For the present the outward mail will be despatched from the Cricklewood Aerodrome at about 2.30 p. m., and will be due at the Brussels Post Office at about 5.30 p. m. In the homeward direction a mail will be despatched every week-day, leaving Brussels at 10 a. m. and reaching the London Post Office about 1.30 p. m. The aerial mail fee has been fixed at 2d. per ounce, and there will be unrestricted facilities for posting. Correspondence for Brussels posted in London should normally be delivered on the same evening without express delivery, and correspondence for other places in Belgium by first post on the following morning. Thus a letter for Brussels sent by the aerial service will be delivered at least 12 hours earlier than if it were sent by the ordinary afternoon mail from London; and a letter for a place in Belgium some distance from Brussels, which would not reach Brussels by the ordinary service in time to fall into the onward night mails from Brussels, will be appreciably accelerated by use of the aerial mail service. Every class of correspondence, registered and unregistered, except parcels and insured packets, may be sent. They may be posted at any post office, or, if unregistered, in any public posting-box. Every aerial mail packet must be prominently marked in the top left-hand corner of the cover with the words "Air Mail," or, if express delivery is desired, "Air Mail Express."

List of Licensed Pilots

The Air Ministry has just issued a list of civil pilots' licenses granted and which were still in force on May 31. The list, which specifies the number of license, name of pilot, class, types of machines qualified on, date of expiration of license, and the age of pilot in the case of those licensed to carry passengers, can be consulted at the Department of Civil Aviation, Air Ministry, Kingsway

U. S. Flyers Shot Down in Poland

London.—Two American officers, flying a Hanoverian two-seater, have been shot down by a Bolshevik war plane behind the Russian front according to a dispatch. It names Capt. Merion Cooper and Capt. George Kelly.

They are members of the American flying squadron fighting with the Poles, numbering about a dozen men, formerly members of the Lafayette Escadrille in France, and now called the Kosciusko squadron.

The French Competitions

Of the competitions which are being organized by the Service Technique de l'Aeronautique in France, that for motors has been again postponed to January 1, 1921, while the aeroplane competition is to start on August 15. The entries for the latter are from the Caudron, Breguet, Farman, Latécoère and Bleriot firms.

"Stunting" in Switzerland

Evidently the authorities in Switzerland have decided that prudence is the better part of stunting. At any rate, it is announced that henceforth Swiss airmen who want to do "stunts" will have to obtain a special license, to have a very careful official examination of their machines made, and to insure themselves for £750.

Aerial Navigation Regulations in France

M. Deschanel, President of the French Republic, has signed a decree formulating regulations under which aircraft may fly in France.

Under its terms aeroplanes of nations who are signatories of all aerial international agreements to which France is a party have right of passage through that country. As in Great Britain, there are certain prohibited areas over which neither airships, balloons nor aeroplanes may fly. Aircraft from foreign countries must not diverge from the aerial routes which will be listed at a later date.

All aircraft, French or foreign, may fly freely in France provided the following conditions are observed: (a) that they carry a navigability certificate; (b) that they are registered in accordance with the prescribed regulations; (c) that they bear the insignia of registration and nationality; (d) that they carry the necessary certificates for the personnel on board; (e) that they carry a list of passengers and (f) a bill of lading in the case of merchandise; (g) that a duly maintained log be carried; (h) that if wireless is fitted the necessary licenses are carried, and (i) that in the case of mails the postal authorization be carried.

The Under-Secretary of State for Aeronautics will issue shortly the conditions under which certificates and licenses will be issued and the regulations in regard to the keeping of logs.

ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon

CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB
921 Ravenna Boulevard, Seattle, Wash.
BAY RIDGE MODEL CLUB
8730 Ridge Boulevard, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE CLUB
Bloomington, Indiana
BROADWAY MODEL AERO CLUB
931 North Broadway, Baltimore, Md.
TRIANGLE MODEL AERO CLUB
Baltimore, Md.
NEBRASKA MODEL AERO CLUB
Lincoln, Nebraska
BUFFALO AERO SCIENCE CLUB
c/o Christian Weyand, 48 Dodge St., Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicago, Ill.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bldg., Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB
455 Murray Ave., Milwaukee, Wis.
CONCORD MODEL AERO CLUB
c/o Edward P. Warner, Concord, Mass.
MODEL AERO CLUB OF OXFORD
Oxford, Pa.
CAPITOL MODEL AERO CLUB
1726 M Street, N. W. Washington, D. C.
AERO SCIENCE CLUB OF AMERICA
Beach Bldg., E. 23rd St., N. Y. City
AERO CLUB OF LANE TECHNICAL HIGH SCHOOL
Sedgwick & Division Streets, Chicago, Ill.

Illinois Model Aero Club News Bulletin

On Friday, June 4, at our regular club meeting, the Illinois Model Aero Club was entertained by the University High School students in return for a contest which we staged at their school. A very interesting experiment with liquid air was carried on and the usual stunts of freezing mercury, alcohol, flowers, etc., showed some of the extraordinary properties of this substance.

On Tuesday, June 18, the I. M. A. C. held its annual banquet. All present were given a delightful time by the varied program. The speakers of the evening were Messrs. J. J. Lucas, A. E. Nealy, R. Jaros, E. Partridge, J. S. Stephens, B. Pond, W. L. Brock, C. Dickens and W. E. Schweitzer.

During the meeting of Friday, July 2, the semi-annual club election was held. The results were as follows:

J. J. Lucas, President.
H. Wells, Vice President.
W.. L. Brock, Second Vice President.
L. W. Chatroop, Secretary.
L. Davies, Treasurer.
W. E. Schweitzer, Corresponding Secretary.
R. Jaros, Chairman of Contest Committee.

Indoor Contests, Winter

During the winter of 1919 and spring of 1920 the Illinois Model Aero Club held a series of three indoor contests, any type of model eligible. Prizes of subscriptions to various aviation magazines, batches of rubber and model supplies were among the fruits for the winners. Many old and new members contributed to these events and to the third contest there were seventeen entrants all interested in the advance of model aeronautics.

A list of the results are as follows:

Name.	Contests Entered.	Points.
W. E. Schweitzer	3	289
R. Jaros	3	269
Snyder	2	92
Coe	2	75
Lang	2	70
Corey	2	67
Wakem	2	45
DeLancy	2	35
Melbye	2	34
Reford	1	14
Pond	1	13
Chatroop	1	12
Breckenridge	1	9
Sprague	1	9
Cole	1	8
Docherty	1	8
Top	1	8

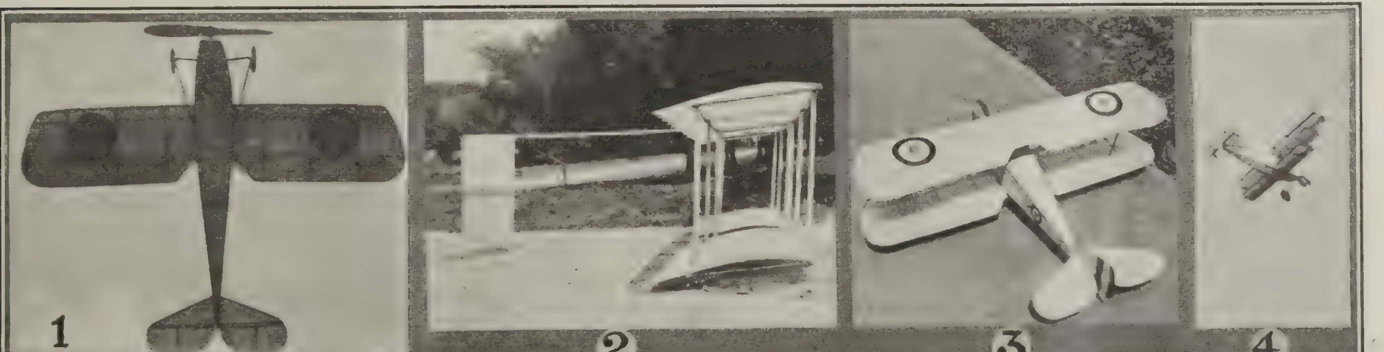
Models Built by Carl Fastje

The models shown on this page are a few of the many built by Carl Fastje of Denison, Iowa, and much credit must be given him for such careful workmanship. Number 1 is a scale model of the Ansaldo Balilla, A1 Scout, view from directly underneath. This model has a 30-inch span and uses an 11-inch propeller, with rubber strand motor. Several successful flights have been made with it. Photo number 3 is a view of the Scout from above. It can be seen that Mr. Fastje has taken great pains in reproducing this plane.

Number 4 is a scale model of the German Fokker Triplane in the air. This too is an excellent piece of workmanship.

Number 2 is a man-carrying glider of 20 ft. span and 4 ft. chord.

Among the many other types of scale models built by Mr. Fastje are the Curtiss JN4B, a Bleriot monoplane and a German A.G.O. biplane, also several R.O.G. racing models. One of his models recently made a duration of over two minutes in the air. He is now building a compressed air-motored model which we hope to show on this page in the near future.



1. Model of Ansaldo Balilla A1 Scout biplane, looking directly underneath. 2. Man-carrying glider. 3. View from above of the Ansaldo Balilla Scout. 4. Model of the Fokker triplane in the air. All of these were built by Mr. Carl Fastje

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

Anatomical Queries

When can a man buy a cap for his knee?
Or a key to the lock of his hair?
Can his eyes be called an academy,
Because there are pupils there?
In the crown of his head what gems are found?
Who travels the bridge of his nose?
Can he use when shingling the roof of his mouth,
The nails on the end of his toes?
Can the crook of his elbow be sent to jail?
If so what could he do?
How does he sharpen his shoulder blades,
I'll be hanged if I know—, do you?
Can he sit in the shade of the palms of his hands?
Or beat on the drum of his ear?
Does the calf of his leg eat the corn on his toes?
If so why not grow corn on his ear?

—*Dizzy Cadet* (*Fly Leaf*).

On the Mend

M.D.: How's the patient's heart action this morning, nurse?
R. N.: Splendid, doctor. He's proposed to me twice already.

Not Necessarily

"Thank heaven, the air is free anyhow!"

"I'm not so sure of that. I had an automobile tire pumped full of it yesterday and it cost me a dollar."

Futile

"John," snapped Mrs. Gabb sharply, "you're the rudest man I know. Here I've been talking and you've been yawning in my face for the last half hour."

"I wasn't yawning, my dear," replied her husband meekly. "I was just trying to say something."

Wanted: Aeroplanes to deliver drinks from clubhouse to golfers stranded on the links.—*Aerial Golphing Klub.*

Wanted: Aviation helmet, aerial derby preferred.

—*Dum Bell.*

Temeritous Offer

In case of death, call us on the phone, wherever you may be, and our representative will be with you without the least possible delay.—*From an undertaker's advertisement in the New York Times.*

Just Like an Aviation Camp

The Skipper: "Well, sergeant, has that detail got rid of that sea of mud yet?"

Top Kick: "Yes, sir. Pushed it all into the creek, sir."

"That's good. I suppose they have laid duck-boards all around the barracks?"

"Yes, sir, and the mess hall, too."

"Have you put that floor in the kitchen?"

"Yes, sir, the carpenters have just finished."

"Have all the men good bunks and dry straw?"

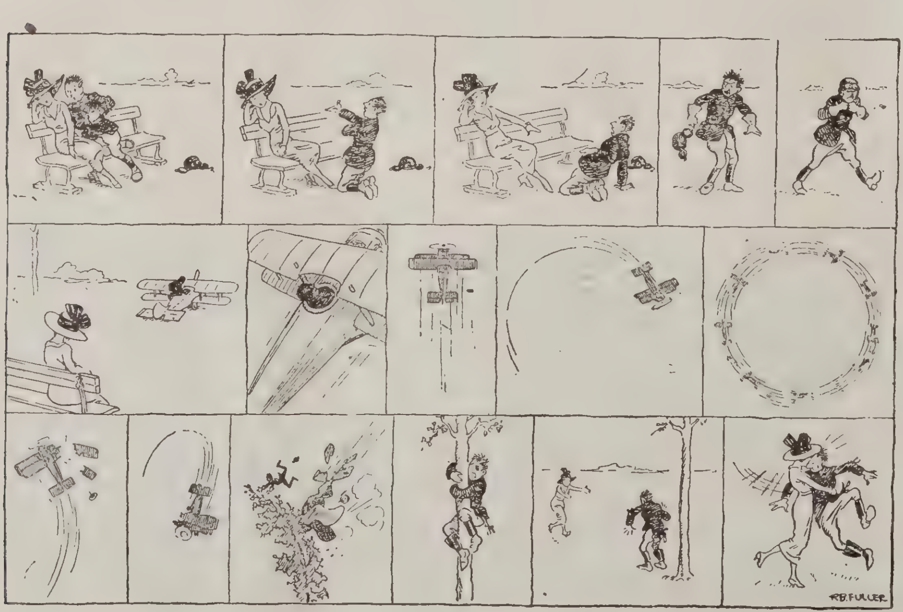
"Yes, sir, the sergeant in charge of quarters reports that all the men are comfortable."

"And the bathhouse?"

"It will be ready for use this afternoon."

"Well, sergeant, better tell the men to turn in early to-night. We will move at nine o'clock to-morrow morning."

—*Overseas Castle* (113th Engineers).



The Air-man's Wooing

(*Courtesy, The Naviator*)

"Right dress!" bawled the top kick. "Out a little there in the center. Murphy, look at the top button on the second man to your right."

"Can't do it, Sarge."

"An' why the gallopin' tripe can't you?"

"Because it ain't there."

—*The Red Diamond.*

First Aviator: "You know, Rodney, those queer dreams one has at times on being caught in public with no clothes on? I had the actual experience to-day in a crowded tram car. What do you suppose happened?"

Second Aviator: "Tell papa what happened."

First Aviator: "I had forgotten my spurs."—*The Red Diamond.*

(*Continued from page 799*)

On receipt of one of these textbooks Charles Jerome Edwards, one of the defendants, wrote as follows:

"I have this morning received from the Century Company a copy of the new Text Book. It is wonderful.

"I haven't had a chance to go over it, or hardly to look it over; but what I have seen fills me with joy and gladness. It is a delight to the eye, an inspiration to the mind; fine, fine, fine!

"My goodness, when I realize what you have done and how unselfish you have been about it all—how you have never lost the faith, and how you have overcome every obstacle raised in your path, it makes me give thanks to Heaven that such good fortune should fall to America, to the Aero Club of America, and that Aviation should have you in their midst.

"Yours cordially, as always, only more so—just as obligation increases,

(signed) Charles Jerome Edwards."

Another member of the Board of Governors, Mr. Henry A. Wise Wood, wrote as follows:

"I hasten to congratulate you upon your Text Book of Naval Aeronautics, which is but the last of the invaluable contributions which you have made to the progress of aeronautics. As one who from childhood has had the welfare of the aeronautical movement at heart, as well as a responsible officer of the Aero Club of America, I want to thank you for this superb and most useful work.

"Furthermore, I wish to express my admiration of your great genius, and the unselfish devotion with which you have unremittingly applied it to the development of the aerial sciences. The world does not yet appreciate how deeply it is in your debt.

Cordially,
(signed) Henry A. Wise Wood."

Mr. Charles L. Poor, another defendant in this action, wrote as follows:

"I received a day or two ago your superb book, 'Textbook of Applied Aeronautic Engineering,' for which I am duly grateful. The work is very fine indeed, and I congratulate you most sincerely.

Very sincerely yours,
(signed) Charles Lane Poor."

Rear Admiral Bradley A. Fiske, U. S. N., another member of the Board, wrote as follows:

"I have just received a present that was handsome, instructive and wholly unexpected! Such good fortune occurs but seldom.

"I do not see how you find the time in which to do so much effective work. You must have made some invention like those of Archimedes that astonished the Syracusans, when he moved great masses by means of pulleys and levers. Most men that I know have no time for doing anything except earning a living. You write books, and make speeches and 'run' magazines, and make money. You even have time to keep good-natured and most men need a lot of time, if they are to keep good-natured.

"I congratulate you on your achievements, and I am

Ever Sincerely Yours,
(signed) Bradley A. Fiske."

These are only a few of a score of similar letters received from officials of the club regarding deponent's textbooks.

Further evidence of bad faith on the part of defendants in their loose and unfair remarks regarding plaintiff's relations to the Aero Club is found in the letters which one of the defendants and other members of the Board wrote to plaintiff on the occasion referred to in December 1916, when he requested to be relieved of the management of club affairs outlined in the attached Exhibit. Then said Charles Jerome Edwards, one of the defendants in this action, wrote as follows:

"I have the sky-scraper letter from you dated December 18th, which only arrives this morning and appears to have been mailed on December 27th.

"I have not had time as yet to read it through in detail, but I gather that the opening paragraph and the concluding paragraphs suggest some change in your relations and services to aeronautics and unrelating of your day-by-day work and immediate personal relations from the premises of the Aero Club.

"I don't agree to this and would not consent to be a party to any such arrangement, except upon the very decided conclusions of your own mind.

"Criticism there may be; and I will even say there should be, for all good work is bound to raise some spirit of criticism, of envy, or opposition. But I am sure that there is no criticism other than in some individual directions and that as a whole your services and your worth your fidelity and your friendship to the best interests of the club, to the extension of aeronautics and any personal relation toward the men who have early and late, and all the time been factors in the club's development and influence—do not permit of a divorce between us.

Yours cordially,
(signed) Charles Jerome Edwards."

Mr. W. W. Miller, counsel for defendants in this action, wrote as follows:

"Dear Mr. Woodhouse:

"I am in receipt of your letter of December 19th which I have read with great interest. I plead guilty as a Governor of the Club in not having one-half appreciated or understood the tremendous amount of work being done by you for the causes for which the club stands, and I for one should be very sorry should circumstances be such as to require you, in justice to yourself, to ask to be relieved of part of your burden.

"I sincerely trust, however, that you will be able to so arrange matters as to let the good work go on.

"I extend to you my congratulations in respect of the results already accomplished by you.

Yours very truly,
(signed) W. W. Miller."

Mr. W. Redmond Cross, another Governor, wrote as follows:

"Dear Mr. Woodhouse:

"I have been over your letter very carefully and want to have a talk with you in regard to it but I fear that this cannot be until after New Year's, as I expect to be out of town more or less during the next ten days. In the meantime, I should like to say that I rank your work for the club and for the movement as of the first importance and what I wish to do is to find a practical method of preserving the great value which you represent to the cause and, at the same time, doing away with the criticisms to which you refer. I believe that this problem can be solved without much difficulty and I should like to confer with you in regard to it before the next meeting of the Board of Governors.

Yours very truly,
(signed) W. R. Cross."

As similar expressions were received from practically all the members of the Board, plaintiff continued supervising this extensive work for the club and to contribute financially and otherwise to the club, at the sacrifice of his own personal interests.

Resolution Adopted on Mr. Woodhouse's 34th Birthday

The Executive Committee of the Aero Club of America at its June 26th, 1918, meeting, on the occasion of Mr. Woodhouse's 34th birthday, unanimously adopted the following resolution:

WHEREAS, Mr. Henry Woodhouse, having, in the opinion of the Governors of the Aero Club of America, earned an acknowledgment of their appreciation of his extraordinary achievements on behalf of the aeronautical movement, the movement for national preparedness, and the club, and

WHEREAS, The many undertakings initiated and so successfully carried out by Mr. Woodhouse and his associates having proven of great value to the country and the cause of the Allies, and the Club, and

WHEREAS, The creation of aeronautic reserves and aerial coast patrol units, trained at private expense, resulted in giving the War and Navy Departments about 300 aviators, who were the first aviators to be sent to France; and

WHEREAS, By his exceptional vision, good judgment and energetic efforts Mr. Woodhouse has contributed in many ways to creating interest in the war, building the Air Forces, the Liberty Loans, the Aero Mail, delivering aeroplanes across the Atlantic, the French Aerial Warfare Exhibit and other activities of great importance as contributions towards winning the war; together with other services which he has rendered; and

WHEREAS, By these activities and his untiring devotion to the cause for which the Aero Club of America stands, and to his colleagues, Mr. Henry Woodhouse has won the admiration and esteem of his fellow governors, therefore,

BE IT RESOLVED: That the Board of Governors of the Aero Club of America hereby tenders to Mr. Henry Woodhouse its thanks, and this expression of its appreciation of the invaluable services which he has rendered to the nation, the aeronautic movement, and the club.

(*To be continued*)

FLOYD SMITH LIFE PACK

Pat. 1920. Any infringement will be prosecuted.

FLOYD SMITH AERIAL EQUIPMENT CO.

Manufacturers and Patentees of the

Floyd Smith Life Pack

Read the following expressions from some of our foremost fliers.

MAJOR R. W. SCHROEDER, A. S. A., Chief Test Pilot, U. S. Air Service:—

> "I have become so accustomed to wearing your pack that I feel lost without it. In fact, I feel uneasy without it. On my last high flight, I must say that the pack was the dearest thing in my life."

ROLAND ROHLFS, Chief Test Pilot, Curtiss Aeroplane & Motor Corporation:—

> "Congratulations to you on your wonderful Parachute. I jumped yesterday with good success. I am a strong booster for your chute."

and many others.

Can you afford to be without one?

Information and price furnished on application.

FLOYD SMITH AERIAL EQUIPMENT CO.
367 W. ADAMS ST., CHICAGO, ILL.

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TEXTBOOK OF NAVAL AERONAUTICS, Henry Woodhouse	6.50
TEXTBOOK OF MILITARY AERONAUTICS, Henry Woodhouse	6.50
THE AERO BLUE BOOK, Henry Woodhouse	5.15
AIRCRAFT OF ALL NATIONS, Henry Woodhouse	.30
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WEEKLY

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Airscape of Luna Park, Coney Island

The Gordon Bennett Aviation Trophy

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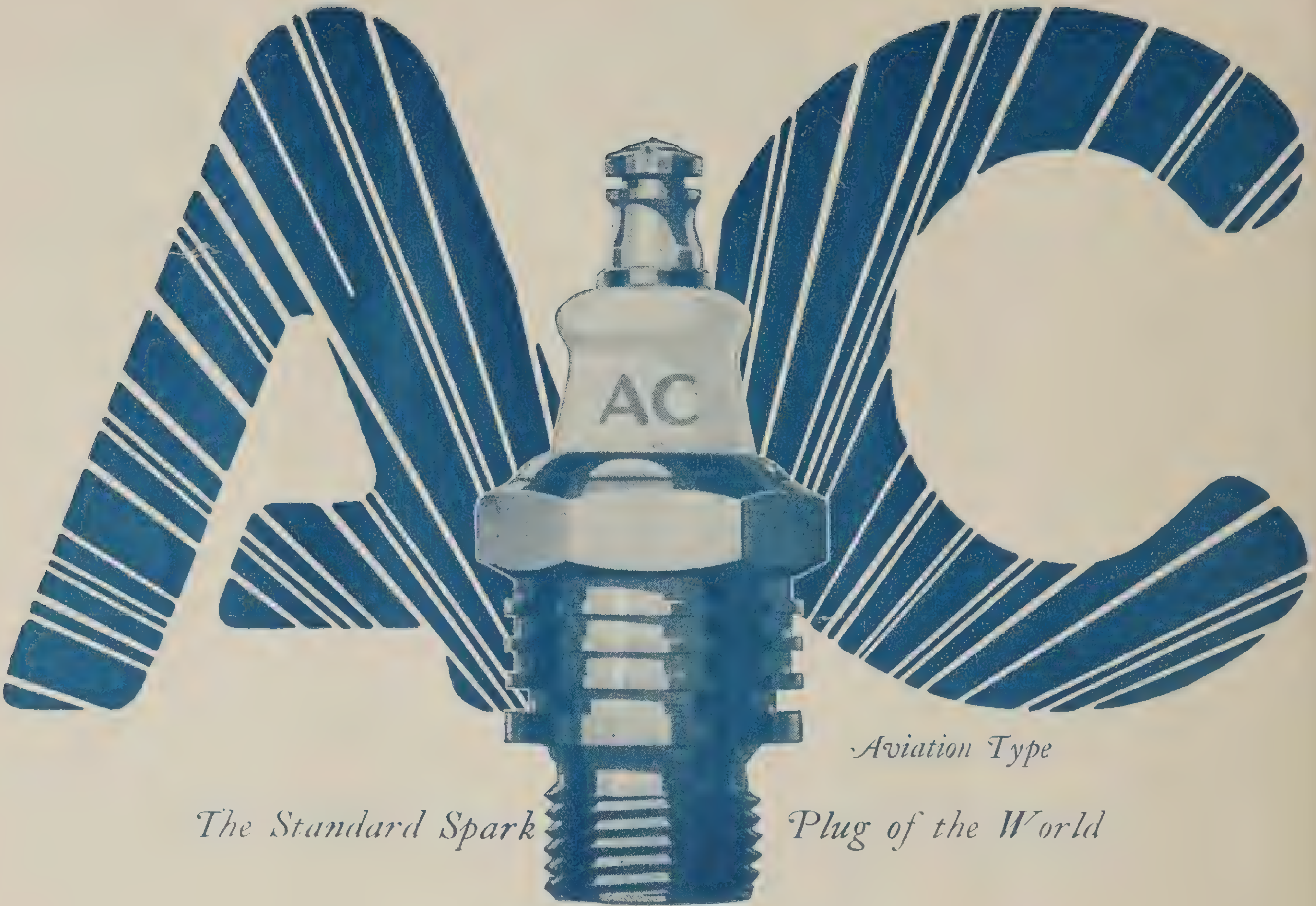
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VOL. XI AUGUST 30, 1920 NO. 25

TABLE OF CONTENTS

PAGE

The Gordon Bennett Aviation Trophy 829

Evidence of Vicious Conspiracy to Destroy Aero Club of America Submitted to the Supreme Court—Part III 830

The News of the Week 832

The Aircraft Trade Review 834

U. S. Aerial Mail 835

The Alula High Lift Wing 836

Book Reviews 838

Preliminary Choice of a Wing Section 839

Naval and Military Aeronautics... 843

Foreign News 844

Elementary Aeronautics and Model Notes 845

Aeronitis 846

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THE GORDON BENNETT AVIATION TROPHY

THE American teams who are to compete for the International Gordon Bennett Aviation Trophy have sailed and the racers have been shipped.

The country at large should feel gratified over this fact and over the fact that *four American teams* are on their way to represent America in this classic contest, so that if delay or unforeseen circumstance should prevent one or two from participating America would, nevertheless, be better represented in this race than it has ever been.

Furthermore, the American teams are American in personnel as well as in equipment. For the first time since 1909, when Glenn H. Curtiss alone represented America in the first contest for this trophy, there are three fully equipped American teams with American aeroplanes especially designed and built to match the best European aeroplanes expected to participate in this contest.

Editors of Aerial Age and Flying Credited With Having Created Interest Which Resulted in Securing Teams

The editors of AERIAL AGE WEEKLY and FLYING acknowledge with pardonable pride the credit accorded to them for having created the interest in the coming Gordon Bennett Race which resulted in securing the entries.

It is a fact that when we undertook the persistent educational campaign to make the American Aeronautic Movement realize the opportunity afforded by the Gordon Bennett Cup Race for gaining international prestige and distinction, there was no interest whatever in the subject.

The matter was discussed with officials of the Aero Club of America, and our editorials and articles were sent to the members of the Board of the Club and chairmen of committees. With two exceptions the Aero Club of America officials held that it was too soon after the war to expect people to become interested in flying as a sport.

Finally a letter was sent out, unofficially, to the aero clubs and manufacturers, with copies of AERIAL AGE editorials, asking whether they would like to make entries. Within a week after mailing these papers a telegram was received from the Aero Club of Texas announcing the entry of Mr. and Mrs. S. E. J. Cox, and soon after followed the Dayton-Wright entry. Subsequently came the Curtiss and the U. S. Army entries.

We sent our articles to the newspapers and to date we have received over one thousand clippings, showing that the press at large was interested and was willing to help this stupendous undertaking.

The Value of the Gordon Bennett Trophy Competition to American Aeronautic Sport, Engineering Progress and Industry

In AERIAL AGE for February 23d, 1920, the value of the Gordon Bennett Trophy Competition to American Aeronautic Sport, Engineering progress and industry was defined as follows:

"The designing and constructing of an aeroplane capable of making 200 miles an hour will be stupendous history making achievement in the science of aeronautics.

"To fully understand the significance of such an achievement one must consider the fact that there is not in existence today engineering data upon which the design and construction of an aeroplane of 150 miles per hour speed can be based. Nor are there aerodynamic laboratory means of testing a model of an aeroplane intended to make 150 miles or over per hour. The fastest wind tunnel for testing aeroplane models and determining their efficiency has a wind speed of less than 150 miles an hour. The engineers and constructors of the 200 mile per hour racer will, therefore, be writing history in aeronautic engineering when designing and building these machines.

"This development will also be of great value from a military standpoint. Practically all the engineering data and experience which enabled the Allies to build fast military and naval aeroplanes in the first two years of the war had been obtained from designing and building fast aeroplanes and seaplanes for racing before the war.

"Sportsmen gave aeronautic engineers inducements and a free hand. They asked them to produce their best and the engineers did their best and each succeeding Gordon Bennett Trophy race brought great increase of speed combined with efficiency of design and improvements in air worthiness.

"The Gordon Bennett Trophy was won in 1909 by Curtiss with a speed of less than 50 miles per hour; in 1910 by Grahame-White with less than 63 miles per hour; in 1911 by Weymann with a speed of less than 79 miles an hour; in 1912 by Vedrines with a speed of close to 110 miles an hour, in 1913 by Prevost with a speed of over 110 miles an hour!

"Now that over two thousand aeroplanes have been purchased for sport, pleasure, touring and transportation, and the demand is increasing daily, it is a good investment to a manufacturer to produce an international winning aeroplane. It creates a market for his aeroplanes the world over."

The Cox entry is a monoplane built to specifications laid down by Mr. S. E. J. Cox. It will be piloted in the race by Roland Rohlfs, former holder of the altitude record, with Clarence Coombs as alternate pilot.

The Army entry is a biplane designed by A. V. Verville, aeronautical engineer at McCook Field, and powered with a Packard 600 H.P. motor. Major R. W. Schroeder will pilot it.

The Dayton-Wright entry is a monoplane, equipped with a retractable chassis and a variable camber wing of cantilever construction. It is powered with a 250 H.P. Hall-Scott engine and will be piloted in the race by H. M. Rinehart.

EVIDENCE OF VICIOUS CONSPIRACY TO DESTROY AERO CLUB OF AMERICA SUBMITTED TO THE SUPREME COURT—Part III

Supplemental Affidavit Filed by Mr. Henry Woodhouse in the Supreme Court Through His Attorneys, Nugent & Nugent, 280 Madison Avenue, New York City.

SUPREME COURT—NEW YORK COUNTY.

Henry Woodhouse,
President,

against

Aero Club of America and Charles Jerome Edwards, Acting President, Charles L. Poor and James A. Blair, individually, and as Governors of said Aero Club of America. } *Affidavit*

State of New York, }
County of New York. } ss.:

Henry Woodhouse, being first duly sworn, deposes and says: That he is the plaintiff in the above entitled action. That as supplemental to the affidavit herein of deponent sworn to July 20th, 1920, deponent alleges:

Evidence of Falsehoods Circulated To Destroy Aero Club of America's High Reputation.

That to substantiate his allegations concerning the connections between the Manufacturers Aircraft Association, the American Flying Club and these defendants and their conspiracy to obtain control of the Aero Club of America, deponent annexed hereto copy of correspondence had between Lawrence L. T. Driggs, President of the America Flying Club and Colonel William G. Barker, of the Aero Club of Canada, and as well as a general letter dated December 20, 1919, signed "American Flying Club by Lawrence L. T. Driggs, President," and letter sent by Aero Club of America dated January 9, 1920, and which series is marked Exhibit A and made part hereof.

Further in the London publication of February 4, 1920, known as *The Aeroplane,* **appeared the following malicious and false statements concerning the Aero Club of America** and which statement is signed "The American Flying Club, Lawrence La Tourette Driggs, President."

"The Aero Club of America has done nothing since the war to help aviation in the States, and there are those who do not hesitate to say that the American Aero Club, or at any rate a certain section of it, was actively pro-German during the war. In any event the value of the two clubs should be judged by results, and it is evident even to the most casual observer that the American Flying Club does represent American aviators while the Aero Club of America does not.

"Therefore, it would seem that the obviously proper thing is for the International Aeronautical Federation to recognize the American Flying Club as the representative body for American aviation, and to cancel its recognition of the Aero Club of America. The other alternative is for the committee of the Aero Club of America to resign or be kicked out en masse, and for the American Flying Club to take over the name and position of the Aero Club of America.

"A contributory cause of the unpopularity of the Aero Club of America among American aviators is the fact that aviators do not like the long-winded stories with which the Aero Club of America has been feeding its members during and since the war. Also, they do not think it fitting that a few members of the club should be continually sending out press notices about themselves and organizing big banquets at which these same members are always the chief speakers. As a valued correspondent remarks, all this self-advertising by a few members is like the President of some South American Republic continually bedecking himself with new honors. Moreover, the Aero Club of America appears to be bent on making itself still more ridiculous than it has in the past by pretending to organize a wonderful 'Aerial Derby' race round the world. Obviously the time is premature for any such attempt, and the Aero Club of America is merely bringing ridicule on itself and on American aviation by trying to get cheap advertisement out of talking about a race which cannot possibly be a success.

"The difference between the two clubs is very well put in a note from Mr. Joe Weil, R.M.A., formerly a lieutenant in the United States Army Air Service, and now aviation editor of the 'New York Telegraph.' Mr. Weil says:

"'The American Flying Club fills a much-needed place in the aviator's life. At the Aero Club of America he found himself in an atmosphere of non-fliers who "talked" aviation. Here he finds himself among his own kind. It is a club of fliers, for fliers and run by fliers. That is why in so short a space of time it has become the leading aviation club of the United States, and why other clubs are wishing to affiliate with it.'

(No editor by the name of Weil could be found at the "New York Telegraph.")

"This puts the matter quite concisely, and one hopes that this exposition of the case will assist the serious European Aero Clubs in deciding which club is truly representative of American aviation.

* * * * * * * * *

"As to initial procedure of organization, it is recommended that twenty-five charter members sign an agreement to incorporate under the above plan. Copy of the Constitution and By-Laws will be furnished upon request. After organization, a member of the Committee on Affiliations of the American Flying Club of New York will visit the local club and assist in its organization.

"Signed for THE AMERICAN FLYING CLUB,
"Lawrence La Tourette Driggs, President."

Furthermore from time to time during the past months various attacks against the Aero Club of America as well as statements of an alleged merger thereof with the American Flying Club have appeared at the direct instance of the Manufacturers Aircraft Association. These defendants and officials of the Flying Club; for instance, the *New York Evening Post,* of April 8, 1920, states:

"Ever since the war brought aviation into national prominence there has been considerable disagreement between organizations interested in flying, with the result that there has been no general agreement as to plans for aeronautical development. Friction has occurred between some of the most prominent organizations such as the Aero Club of America and the American Flying Club and much effort which might have been applied toward the promotion of aviation has been wasted in dispute."

The Baltimore, Maryland, *Star,* of April 10, 1920, states:

"Merger of the Aero Club of America and the American Flying Club is being contemplated, according to Jefferson Demont Thompson, president of the Aero Club. Thompson has appointed a committee to consider amalgamation."

The *New York Tribune,* of April 16, 1920, states:

"The resolution empowering Colonel Thompson to appoint this committee was passed a week ago at a meeting of the Board of Governors. As far as could be learned the members are Professor Charles L. Poor, Alan R. Hawley, W. Redmond Cross, Charles Jerome Edwards and Colonel James A. Blair, Jr.

"The appointment of the committee is the first step toward removing the present acute differences between the Aero Club and the Flying Club and the Manufacturers Aircraft Association."

Again under date of April 22, 1920, the New York *Town Topics* states:

"Precisely as I foretold a few weeks ago, the once powerful Aero Club of America, after long-drawn out dissension within its ranks, has stepped down off its pedestal and has appointed a committee of five to try and smooth out the strife by amalgamating that club with 'other aeronautical organizations in this country—meaning no other body, when all is said and done, but the American Flying Club. The names of the men selected by Colonel Jefferson De Mont Thompson, president of the Aero Club succeeding Alan R. Hawley, to compose the peacemaking committee are Professor Charles L. Poor, Alan R. Hawley, W. Redmond Cross, Charles Jerome Edwards and James A. Blair, Jr. This group of diplomats will endeavor, I understand, to 'consolidate peace among warring factions,' which in other words means that the Aero Club is ready or about ready to merge with their rivals, proving the terms of 'absorption' are not too exacting and that the Aero Club will not

pass out of existence entirely or too quickly. The resolution empowering Colonel Thompson to appoint the peace committee was passed about a week ago at a slightly stormy meeting of the Board of Governors of the Aero Club. This move on the part of the Aero Club is the first step toward smoothing over the acute differences between the Aero Club, American Flying Club and Manufacturers Aircraft Association, and the making of the most powerful aeronautical body in the world."

That all of the aforesaid printed statements were inspired by these defendants and the Manufacturers Aircraft Association and caused to be published as part of their conspiracy to belittle the Aero Club of America, cause the public and members of the Aero Club of America to believe such merger as something positive, cause hundreds of such members of said Aero Club of America to resign and embarrass the Aero Club financially and in such manner compel it to yield to the desires and pernicious and wholly selfish and mercenary influence and control of the said Manufacturers Aircraft Association.

With respect to the record and unpatriotic and vicious actions and activities of the said Manufacturers Aircraft Association or Corporation, in the Complete Report of the Senate Subcommittee on Military Affairs, appointed pursuant to a Senate resolution adopted April 30, 1917, to investigate aircraft production in the United States, appears the following:

> **"Although this subject has been referred to a special sub-committee for investigaton, it has constantly obtruded itself upon our attention, hence we cannot avoid referring to it.**
>
> **"The National Advisory Committee of Aeronautics, confronted with the necessity of satisfying the claims of patentees and avoiding possible delays threatened by conflicting patent rights, determined upon mature consideration to settle these difficulties through the agency of a Manufacturers Aircraft Corporation, to be composed of those engaged in the industry and empowered to license all aircraft contractors who should pay a royalty to the company upon all planes and parts to be constructed and to assign to the company for the common use all patents or applications therefor owned or controlled by the licensees. The bulk of these royalties was to be paid to the Curtiss and the Wright-Martin Companies as compensation for the use of certain patents until each had received $2,000,000. These were to be charged against cost of production and paid by the Government. The agreement was sanctioned by the Department of Justice and approved by the Secretaries of War and the Navy.**
>
> **"The committee has not heard a word in approval of it. It is condemned by every airplane manufacturer outside of the immediate beneficiaries. Those executing the license agreements have done so under protest because the Aircraft Board recommended or required it.**
>
> **"Criticisms of it are numerous, the most serious of them being that it subjects manufacturers to onerous requirements by its beneficaries, such as assessments for the use of plans and specifications, the purchase of the material and accessories from favored houses, the assignment and surrender of valuable patents and patentable devices to the Aircraft Association upon terms prescribd by itself, the discouragement of invention, and the inevitabe control of the aircraft industry by that association or by some other interest through its agency. Your committee sympathizes with many of these sentiments, and notwithstanding the Aircraft Production Board as now officered no longer requires or recommends the execution of the agreements by contractors, we believe the arrangement should be abrogated. WE REGARD IT AS VICIOUS AND AS DESIGNED TO REAP LARGE PROFITS BY TAKING ADVANTAGE OF THE NECESSITIES OF THE GOVERNMENT."**

Deponent further states that during the month of January, 1920, and while attending the hearings of the Aviation Commission of the State of New York, he met Mr. George H. Houston who on that date was Treasurer of the Manufacturers Aircraft Association and that at said time and place the said Houston stated to deponent that he felt the Aero Club of America should take over the American Flying Club because the operation of said American Flying Club had become such a drain on the financial resources of the Manufacturers Aircraft Association and its members as to be burdensome. That thereupon deponent asked how he considered such an arrangement could be effected inasmuch as several of the officers of the said Flying Club, including Diffin and Conger, could under no circumstances be accepted as members of the Aero Club pending a final Government investigation of certain charges outlined by Mr. Bernard M. Baruch, in his letter to the Aero Club of America, dated October 29, 1918. **That Mr. Houston stated to deponent one Mr. S. S. Bradley, the manager of the American Flying Club, and that he and other employees of the said Manufacturers Aircraft Association conducted and controlled the affairs of the said American Flying Club; and that if the officials of the Aero Club of America would only indicate a desire to consider the matter, he, Mr. Houston, speaking for the said Manufacturers Aircraft Association could arrange to deliver the American Flying Club upon any conditions agreed upon.**

That deponent reported the substance of this said conversation to officials of the said Aero Club of America and as a result thereof conducted an investigation of the financial and other interests of said American Flying Club and in connection therewith requested and received information from various sources, and was supplied with copies of the minutes of meetings of said Manufacturers Aircraft Association, and which minutes disclosed, among other things that said Manufacturers Aircraft Association, at the instigation of one, Albert H. Flint, President thereof, Frank H. Russell and said S. S. Bradley, had purchased many thousand dollars of bonds of the American Flying Club at various times. That on August 7, 1919, the said Albert H. Flint forwarded a telegram to Benjamin Foss of the Sturtevant Aeroplane Co., Jamaica Plain, Boston, Mass., reading as follows:

> **"Houston, Russell, Bradley and myself are in favor of investing Association funds to the extent of five thousand dollars in bonds, of the American Flying Club. If this meets with your approval kindly wire Bradley.**
>
> **(signed) A. H. Flint."**

That on this occasion the said Benjamin Foss protested on the ground that it would not look good in public if it became known but said Bonds nevertheless on such occasions were purchased.

Deponent further discovered from said minutes and other sources of information that the said Manufacturers Aircraft Association had regularly appropriated and assigned to its agents large sums of money to be used to "influence legislation" for the purpose of obtaining control of aeronautics and securing large and unwarranted Government subsidies for the few members of the said Manufacturers Aircraft Association who do not represent the Aeronautic industry.

Further that deponent's said investigation developed the close and intimate association existing between the defendant herein, James A. Blair, Jr., and the said George H. Houston and that these said gentlemen were on terms of great intimacy and that the said defendant James A. Blair, Jr., together with the said George H. Houston and said S. S. Bradley had been members of the American Aviation Mission which had gone to Europe to study aeronautics and **which mission was reported to have issued the orders and instructions while in France which resulted in the burning of military aeroplanes at Colombey-La-Belle, France, which had cost the United States Government over $2,000,000.00 and which event so greatly shocked the American public.**

In view of these facts and the facts that Mr. Frank H. Russell, then President of the Manufacturers Aircraft Association, in November 1918, following the signing of the Armistice had called upon the Aero Club of America and myself as an active official thereof and, to deponent's personal knowledge, **requested that we support a scheme for the burning of thousands of new and used Government Aeropanes then at various points in the United States, which had cost the American Pubiic over $100,000,000.00, I considered it my duty to both the Aero Club of America and my Country to make this investigation very thorough and to present the facts obtained as a result thereof to the Board of Governors of said Aero Club of America for their consideration, believing that said Board would unquestionably consider it its duty to submit such evidence to the United States Attorney-General, but, as the minutes of the various meetings of said Board of Governors of said Aero Club of America will show, on each and every occasion such attempts on deponent's part were blocked by the defendants herein, Charles Jerome Edwards, Charles L. Poor and James A. Blair, Jr., and such blocking was brought about by rump, irregular and illegal methods.** Furthermore even up to the present time, despite the repeated attempts of deponent to bring the matter of the present action before said Board of Governors as a body, he has not been able to do so because of these defendants. At the meeting of said Board held on July 21st, 1920, deponent endeavored to have this said action, in which the Aero Club of America was named as defendant placed before the said Board but the de-

(*Continued on page* 842)

THE NEWS OF THE WEEK

American Planes Go Abroad for Race

Guarded carefully, America's three entries in the James Gordon Bennett international aeroplane trophy races are now on their way to France. The planes have been subjected to all kinds of rigid tests, and so careful were the owners to guard the records of performances that less than a hundred persons saw the planes in flight.

According to aero enthusiasts who have been abroad recently, the forthcoming contests are arousing countrywide attention in England, France and Italy. The races will be held at Etamps, near Paris, from Sept. 27 to Oct. 3 over a circuit course of 300 kilometers (186.3 miles). In addition to the Bennett Cup, the winner will receive a prize of 10,000 francs offered by the Aero Club of France. The contests will be under the rules of the Federation Aeronautique Internationale.

Glenn H. Curtiss won the first race for the cup in 1909, using a biplane which, though attaining a speed of only forty-seven miles an hour, was more than fast enough to beat the seven other entries from European countries. The following year Claude Graham White in a Bleriot monoplane won the cup for England. He flew at sixty-three miles an hour. C. T. Weymann, an American, brought back the trophy to this country in 1911, flying a Nieuport monoplane at a speed of eighty miles an hour. Jules Vedrines came over from France in 1912 and took the trophy home. He used a Deperdussin monoplane which made a speed of 105 miles an hour. France still has the trophy, Maurice Prevost, another Frenchman, having won the honor for his country in 1913. The war prevented the contests being held again until this year.

The planes with which America hopes to capture the Bennett cup are a Cox monoplane, entered by S. E. J. Cox, Vice-President of the Aero Club of Texas; a monoplane entered by the Dayton-Wright Airplane Company, and a plane sponsored by the United States Air Service. These three planes will compete against a score of foreign machines. Great Britain, France and Italy are listed as the chief competitors, but Germany, though barred from the race, is believed to have entered five of her latest types of aircraft through neutral countries, such as Holland and Denmark.

Airmen are of the opinion that the winner of the race will have to fly at a speed of more than 200 miles an hour. Little has been divulged concerning the foreign entries, but it is known that governmental agencies are aiding in the development of speedy machines.

JL-6 Completes Transcontinental Round Trip

The JL-6 all-metal monoplane arrived at Central Park Field, Long Island, on August 22, after completing its round trip transcontinental flight to and from Los Angeles. The aeroplane was piloted by Bert Acosta, with Eddie Rickenbacker, John M. Larsen and E. R. Allyne of Cleveland as passengers.

The aeroplane, with two others, left Central Park, L. I., on July 29 for Los Angeles to blaze an aerial trail for a mail route to the Pacific Coast.

The last leg of the trip was made from Bellefonte, Pa., where the JL-6 had been delayed since last Thursday by haze and rain. The areoplane left Los Angeles on August 4, and just joy-rided eastward.

Other places where stops were made were Amarilla, Tex.; Roswell, N. M.; Omaha, Neb.; Kansas City and Cleveland.

According to Mr. Larsen's calculations, the plane was in the air a total of eighty hours, and a part of that time was spent in joy riding friends. The actual flying time for the round trip was said to be slightly more than fifty-nine hours.

It was said at the field that Pilot Acosta and his passengers had obtained much data that will be of value to the army air service. Wind currents were noted over the entire route and charts were made of the course flown over.

Opera Singer Taking Flying Lessons

Madame Eugenia Olganoff, the Mezzo Soprano, is taking flying lessons at the school of the Philadelphia Aero-Service Corporation. Madame Olganoff is one of the big singers known from coast to coast for her operatic and concert work. While vacationing in Philadelphia she became an aerial enthusiast. Lieutenant Allison, her instructor, reports wonderful progress and expects to solo her very soon.

Many movie favorites and some theatrical headliners are flyers, but it is believed that Madame Olganoff is the first operatic star to take to the air.

To Change Pulitzer Trophy Race Rules

Conditions governing the trans-continental air race for the Pulitzer Trophy will be discussed soon at a meeting of the new contest committee of the Aero Club of America. New members of the committee expect to draw up conditions which will enable the race to be held early in November so as to avoid rough flying weather, which generally comes with the end of that month.

Another proposal to be brought before the committee, which will be new in air racing annals, will be for each flyer to carry a log book in which he shall record the progress of his flight. The army has found data collected in such books extremely valuable in checking the perfromances of planes and pilots and the transcontinental race is expected to make further valuable additions to the club's collection of information.

The Contest Committee intends to ask the army air service and the postal air service for their co-operation in making the race a success.

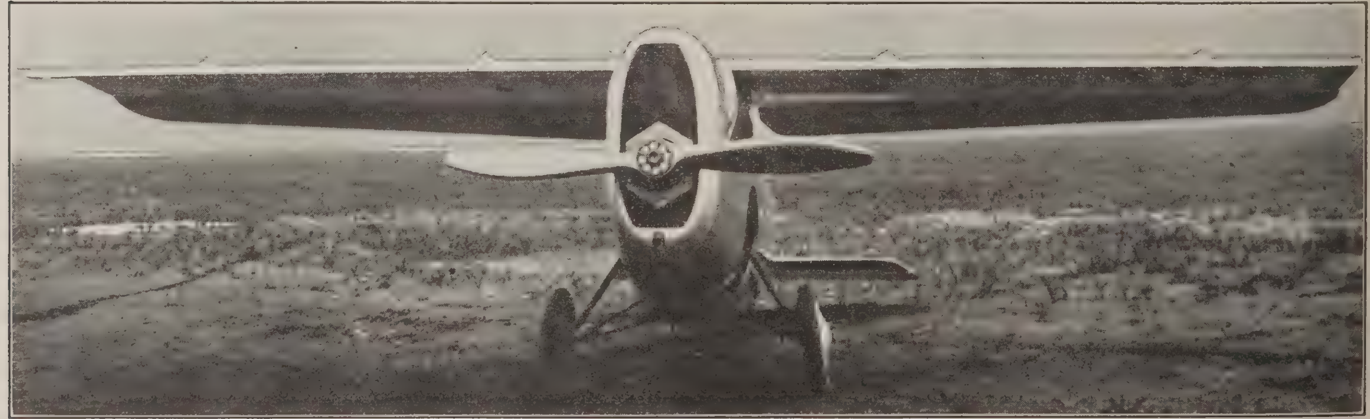
Commercial Talk Held With Aeroplane By Radio

London.—What is said to be the first commercial conversation conducted by telephone through the ordinary central and wireless in an aeroplane was carried out successfully recently in England. It was not an experiment, but was used for the delivery of imperative instructions.

A member of a London shipping firm, using an ordinary desk telephone, was able to give one of his aeroplane pilots flying across the English Channel to Paris, instructions affecting coal supplies at Marseilles, which had run short on account of the Cardiff coal strike. Connection was first established with the Croydon aerodrome and it was then switched through to the air ministry's wireless installation. After two calls by the official at the desk, an answer came from the pilot in the air. The caller was able to hear the whizzing propellers. The pilot told him he was just passing over Folkestone.

Balloon Race Halted Again

The Aero Club of Illinois telegraphed the Aero Club of America that it would be impossible to hold the national and international balloon races for the Gordon Bennett trophies in Chicago this year, be-



The Dayton-Wright monoplane entry in the Gordon Bennett Cup race. H. M. Rinehart will pilot this racer which is equipped with a retractable landing chassis and a variable camber wing of cantilever construction. It is powered with a 250 H.P. Hall Scott engine

cause of the inability to obtain a suitable field with gas facilities. Indianapolis recently refused for the same reasons.

Augustus Post, secretary of the Aero Club, said the races would not be called off despite the difficulties so far encountered. Fifteen American balloons are entered in the national event and eleven balloons in the international race.

Plan Fifty-Hour Aeroplane Service Across Canada

Ottawa.—A transcontinental aerial route, with express aeroplanes offering fifty-hour service between Halifax and Vancouver, will be established soon by the Canadian Air Board, it was announced recently.

Utilizing seaplanes for the eastern portion of the route and land machines for the west, where water landings are said to be impossible, the aerial line will offer complete passenger, express, mail and light freight service.

Control stations are to be established at intervals of twenty miles, with air ports at all principal cities along the route.

Oakland to Regulate Stunt Flying

Oakland, Cal.—In the lead in matters pertaining to the mastery of the air, Oakland is contemplating action looking toward the control of stunt flying. An ordinance, regulating aerial traffic over the city, is asked of the commissioners and is under consideration by Commissioner F. F. Morse. The action is being taken as a result of recommendations made by the Allied Flyers Club.

Conferences are being held with local aviation experts to clarify provisions of the law.

Danger to the aviators is not so much considered in the proposed legislation as is the danger to pedestrians.

Also, it is advanced, stunt flying is doing more than any other thing to hold back the development of aviation.

Flying School Started by Los Angeles Y. M. C. A.

A flying course which will qualify graduates to enter the ranks of professional aviators has been opened by the Los Angeles Y. M. C. A. in conjunction with the Chaplin Aircraft Corporation of that city.

The course will require from eight to sixteen weeks' work on the part of the student, who will receive ground instruction in gas engine construction, repair and operation. Each student must do at least 600 minutes of flying before he qualifies.

The affiliation between the Y. M. C. A. and the Chaplin Corporation has made possible an instruction fee much lower than that charged by the latter organization previous to the merger. This is because of the large number of students who are enrolling for the course.

C. D. Stromgren, principal of the Y. M. C. A. auto school, declared that so far as he knows the Los Angeles Y. M. C. A. is the first in the United States to add such a course to its technical training for young men.

Aeroplanes Detect 17 of 19 Fires

Aeroplanes engaged in forest patrol work operating from the Mather Field base located 17 of the 19 fires reported in the district from July 16 to 31, according to the report of the Forest Service.

Of these 17 fires, 15 were perfectly reported by the aerial observers. Nine of the blazes were detected first by aeroplanes and the other eight were first discovered by Forest Service patrols.

Eleven of the 17 conflagrations were reported by radio, with which all planes used for patrol duty are equipped.

Yolo Fliers' Club Opens New Field

The official opening of the Yolo Fliers' Club Field took place on August 22. A number of aircraft took part in the ceremonies. The Army, Hall-Scott Motor Co., Durant Aircraft Co., Walter Varner, Robert Fowler and a number of other aircraft organizations and aviators had machines on the scene. Eleven different types of ships were entered.

The Fliers' Club arranged for a basket picnic and the grounds were thrown open to the public for the day.

Plan Whale Hunting from a Balloon

Long Beach, Cal.—Whale hunting from a baby blimp is a project of Capt. John D. Loop, a resident here, who has had many years' experience whaling in the old-fashioned way.

Capt. Loop has invented an aerial harpoon to be dropped upon the whale with a buoy attached to trace the leviathan after he is struck. When the whale comes up for air after he is struck the captain proposes to attack him with a bomb gun. A blimp is being rigged at a Los Angeles flying field to try out Capt. Loop's method.

To Use Aeroplanes for Mine Rescue Work

With the co-operation of the Air Service, the United States Bureau of Mines hopes soon to report important developments in mine rescue work through the use of aeroplanes. The bureau has been inquiring into the possibilities of the utilization of aeroplanes for quickly transporting engineers and oxygen rescue apparatus to mine disasters.

Data has been collected on possible landing fields in the flat, low-lying coal fields of Illinois and Indiana, and a co-operative agreement has been made whereby McCook Field, Dayton, Ohio, maintains in readiness planes for assisting the Bureau of Mines safety station at Vincennes, Ind., according to F. J. Baily, assistant director, U. S. Bureau of Mines.

Practical demonstration in the use of aeroplanes in this work will be given at the forthcoming international mine rescue and first aid meet which will be held in Denver September 9, 10 and 11. The Air Service will send two planes to Denver from one of the Texas aviation fields.

Miners and mining operators from Canada, Mexico and this country will give competitive exhibitions in mine rescue.

Aviation Field at Medford, Oregon

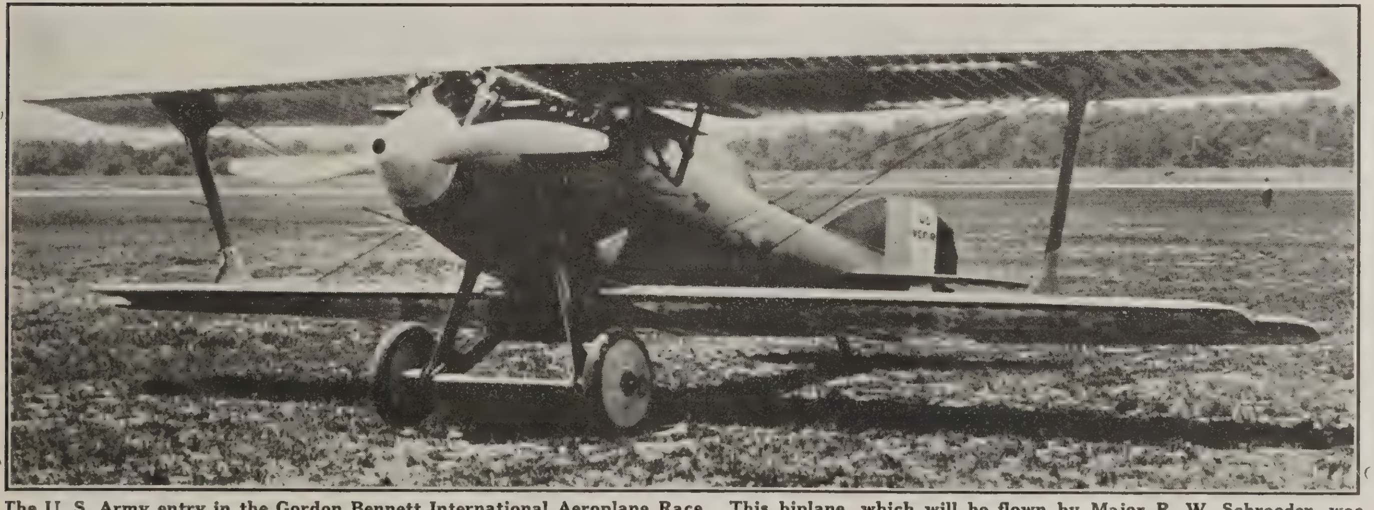
Medford, Ore.—The new county fair grounds at Medford have been transformed into an aviation station as a result of the visit here of Captain Lowell H. Smith, commanding officer of the aero squadron from Mather Field, Calif., which is doing forest fire detection work in that territory. The planes with Medford as the home base will cover a wide expanse of forest in southern Oregon and the upper part of California. The base will have seven hangars and a wireless station when completed. While five aeroplanes will be stationed here, only two will be used each day. The patrol started on July 1.

Aviation School at Pueblo, Colorado

A new aviation company has been incorporated in Pueblo, Colorado, known as the Central Continental Flying School. The organizers are Messrs. Pyle Horchem, H. C. Keller, H. D. and H. A. Muneke, and Ward W. Hench. The company is actively engaged in commercial aviation work and passenger carrying and Pueblo has been witnessing a great deal of flying this summer.

A Laird "Swallow" and a Lincoln Standard aeroplane, both three-seaters, comprise the present flying equipment, and both machines will be used for training work. The school opened on August 25, and students are being enrolled for flying instruction.

The city of Pueblo put into shape a 200 acre field for use as a municipal landing field.



The U. S. Army entry in the Gordon Bennett International Aeroplane Race. This biplane, which will be flown by Major R. W. Schroeder, was designed by A. V. Verville, aeronautical engineer of McCook Field, Dayton, Ohio, and is powered with the Packard 600 H.P. 12 cylinder engine

The AIRCRAFT TRADE REVIEW

Pioneer Company Imports Badin Indicators

The exclusive American and Canadian sales representation of the aircraft instruments made by Badin of Paris has been secured by the Pioneer Instrument Company of Brooklyn, N. Y. Several shipments of the well-known Badin Air Speed Indicators have already been received in this country.

These instruments are familiar to every pilot who flew in France, as practically every plane was equipped with them, M. Badin having supplied over 34,000 to the different Allied Air Forces, 6,000 going to the U. S. Air Service alone.

Form Aerial Company in Nogales, Ariz.

The International Air Service Corporation is the name of a new aviation company framed by leading citizens of Nogales, Arizona, to enter into the new field of transportation through aerial routes. Messrs. James A. Harrison and W. H. Florentine of Nogales, are the incorporators, and the first board of directors embraces Messrs. T. J. Wylie, J. E. Anncondo, W. E. Karns, A. Laroz and W. H. Florentine.

Complete Dayton-Wright Entry for Cup Race

A description of the Dayton-Wright racing aeroplane, third American entry in the Gordon Bennett International Air Race which will be held in France next month, was issued recently. The new machine is a radical departure from all previous designs and is capable of making 215 miles an hour.

The racer is a monoplane of unique type and is already on its way from Dayton, Ohio, to this city, en route to France. Until recently complete secrecy had been maintained concerning it and even army air service officers were not permitted to see it.

It has been officially designated the "R-B," after the initials of its designers, Messrs. Howard M. Rinehart and Milton C. Baumann. Rinehart will pilot the machine in the race.

The R-B differs from all other American aeroplanes in three respects. Its monoplane wing is of cantilever rigid construction, internally braced, and has no external struts or bracing wires. It is equipped with a retractible chassis, and the wing has a variable camber.

The last two technical features add at least forty miles an hour to the speed of the remarkable machine through the elimination of resistance.

The body of the R-B is completely inclosed, and the pilot gets his vision through conveniently placed windows. The wheels of the landing carriage are drawn up into portholes on both sides of the body. The operation of drawing up the landing carriage and changing the wind camber is done by means of a crank on the instrument board. The entire operation takes only twelve seconds.

The racer is equipped with a specially built Hall-Scott 250-horsepower Liberty six motor. The wings are covered with three-ply wood veneer. This covering is strong enough for a man to walk over.

In the air the machine, with its landing carriage withdrawn, looks like a huge bullet traveling at terrific speed. The wings are but 22½ feet from tip to tip and the body 22 feet long.

Collection of Aeronautical Instruments

The official collection of aeronautical instruments maintained by the Bureau of Standards in Washington is a most interesting one and claimed to be one of the most comprehensive in the world. It includes instruments of French, German, British, Italian, Russian, Swiss, Danish, Dutch and Austrian manufacture as well as those made in America.

Curtiss Distributor at Williamsport, Pa.

The McCormick Motor Car Company of Williamsport, Pa., has entered the aviation business and recently become a distributor of the Curtiss Aeroplane and Motor Corporation. At present the company has in stock a Seagull and Oriole, which are both actively engaged in passenger-carrying, aerial advertising and other commercial aerial work.

An airport has been opened on the banks of the Susquehanna River for the flying-boat, and a 100 acre field has been purchased for the operation of the land machine. A hangar 60 x 120 feet is being built on this field. Several more land planes are to be operated soon.

Woodland Plans Big Aviation Meet

Woodland, Cal.—Plans for a big aviation meet for August 22 are being made by the Woodland Flyers' Club, which recently opened a club house. It is planned to assemble as many makes of planes as possible and to hold a flying exhibition.

Nevada City to Have Aviation Field

The Chamber of Commerce of Nevada City, Calif., has decided to establish a municipal landing field and plans are being made for its completion.

Former Air Service Pilots on Barnstorming Tour

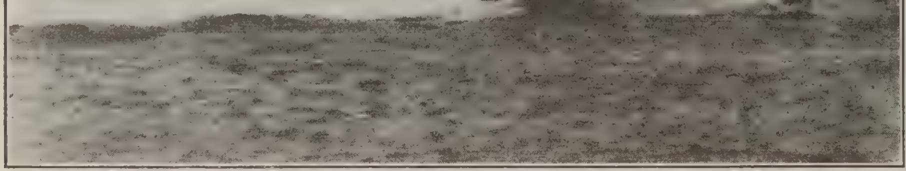
Pilots Greenwalt, Brown, Graham and Collison, all former Air Service Officers, flying three Curtiss JN 4 D's landed at Chanute Field recently. They are all members of the St. Louis Aircraft Corporation with headquarters at Champaign, Illinois. They have been out since May 15th barnstorming over Illinois, and advertising the candidacy of Honorable W. B. McKinley for United States Senator.

Many Planes Sold in Kokomo, Ind.

In the past few weeks four individuals of Kokomo, Indiana, have purchased aeroplanes for their personal use. They are J. C. Patten, who purchased a Curtiss C-6 Oriole, and both he and his son Dick Patten have completed a course in flying at the Kokomo School of Aviation. Fred Ruddell, of the Globe Stove and Range Company of Kokomo, who bought a new Curtiss JN4-D and secured the services of R. L. Muckley as pilot and instructor; Ned Phelps, of the Phelps Automobile Company of Kokomo, who bought a new JN4D, and L. O. Eikenberry, who has purchased a rebuilt JN, and is now doing passenger-carrying work in Indiana, Illinois and Kentucky. Mr. Eikenberry recently completed a course at the Kokomo School of Aviation.

J. C. Pennell, of Fort Wayne, Indiana, recently purchased three Standard J1's equipped with OX-5 motors. These were purchased one at a time through a period of three weeks and Mr. Pennell found after the purchase of the first plane that there was a great possibility in the passenger-carrying and advertising end of aviation. Mr. E. G. Bridges of Anderson, Indiana, purchased a new JN early in the season and he and Mrs. Bridges have used it almost every day in traveling over the state.

All of these purchases were made of the Curtiss-Indiana Company, Kokomo, Indiana, who are the Indiana State distributors for the Curtiss Aeroplane and Motor Corporation. The Curtiss-Indiana Company has a large flying field and repair depot and a complete line of spares and supplies for all types of Curtiss aeroplanes and motors are on hand.



Speed-boat Miss Toronto II, equipped with a Liberty engine, and built by F. G. Ericson of Toronto, in a race with a Canuck training plane

Albert S. Burleson, Postmaster General
Otto Praeger, Second Assistant Postmaster General
Leon B. Lent, General Superintendent, Air Mail Service
Herbert Blakeslee, Assistant Superintendent
John A. Jordan, Chief of Construction

J. Clark Edgerton, Chief of Flying
Charles I. Stanton, Chief of Supplies and Maintenance
Carleton A. Parker, Assistant Chief of Maintenance
George L. Conner, Chief Clerk
John A. Willoughby, Operator in Charge of Radio Experiments

Eugene Sibley, Operator in Charge of Radio Maintenance and Operation

US
AERIAL MAIL

PILOTS

Max Miller
E. Hamilton Lee
Harold T. Lewis
James H. Knight
Walter H. Stevens
Robert H. Ellis
Randolph G. Page
Herbert M. Crader
Samuel C. Eaton
Elmer G. Leonhardt
Frederick A. Robinson
Walter J. Smith
Farr Nutter
Wesley L. Smith
Joseph P. Harris

Duard B. Colyer, Acting Superintendent, New York-Washington Division
Samuel F. Doane, Superintendent, New York-Cleveland Division
Walter H. Riddell, Superintendent, Cleveland-Chicago-Omaha Division
E. W. Majors, Superintendent of Repairs, Bustleton, Pa.
Eugene J. Scanlon, Manager, Air Mail Warehouse, Newark, N. J.
Paul W. Smith, Manager, Newark, N. J.
Maurice J. Kelly, Manager, Bellefonte, Pa.
Howard F. Salisbury, Manager, Cleveland, O.
Andrew R. Dunphy, Manager, Chicago, Ill.
William I. Votaw, Manager, Omaha, Neb.

PILOTS

Cecil R. Benedict
Oscar B. Santa Maria
James T. Christensen
Elmer C. Nichols
John J. McLaughlin
Harry Huking
Glenn V. Conrad
Irving Murphy
Claire K. Vance
Homer W. Johnston
William N. DeWald
Clarence C. Lange
William C. Hopson
W. J. McDonough
D. A. Martin

Plan Start of Transcontinental Aerial Mail September 7th

Major L. B. Lent, general superintendent of the United States Air Mail Service, speaking of the transcontinental air journey of the J-L all metal monoplane, said:

"This is the preliminary reconnaissance trip to make a general survey of the transcontinental aerial mail route between New York and San Francisco. The tentative date for opening the new transcontinental air mail service will be September 7. The route, for some time, has been running daily from New York to Omaha, Neb.

"The present trip is to make final arrangements for the preparation of the airdromes, selection of intermediate landing fields, and emergency stations with their emergency gas and oil equipment; and to gather all permanent data which may enable the mail to be flown safely and expeditiously over this route.

"The trip will be made in J-L-6 all-metal monoplanes, which will be later used in considerable numbers in the transcontinental mail service. The time of mail delivery between New York and San Francisco is estimated at 2½ days, a saving of approximately 2½ days over time by train.

"The route is from New York to Cleveland, Chicago, Omaha, Cheyenne, Salt Lake City, Reno and San Francisco."

Begin Aerial Mail Service Between Western Cities

Fort Snelling, Minn., Aug. 10.—Aerial mail service between Chicago, Minneapolis and St. Paul became effective when Pilot Smith, with four student pilots and a mechanic, arrived at 1.45 P. M. at the Twin Cities landing field near here.

Air mail service between St. Louis and Chicago will be started also, Postmaster Selph announced. The postmaster said he had received a telegram from Otto Praeger, Second Assistant Postmaster General, stating that aeroplanes would leave Chicago and St. Louis each scheduled to arrive at the other city about three hours later.

St. Louis-Chicago Aerial Mail Trip in Less Than Four Hours

Chicago.—The first aerial mail plane from St. Louis to Chicago arrived at 2:20 on August 16th, having completed the trip in three hours and fifty minutes actual flying time. One stop was made at Rantoul, Ill., for fuel.

A mail plane which left Chicago the same morning, at 8:30, Central standard time, for St. Louis arrived there at 12:25 that afternoon, covering the route in three hours and forty minutes actual flying time. The southbound plane also stopped at Rantoul for fuel and oil.

UNITED STATES POST OFFICE DEPARTMENT

CLEVELAND-CHICAGO ROUTE—AIR MAIL SERVICE

Monthly Report of Operation and Maintenance, May, 1920

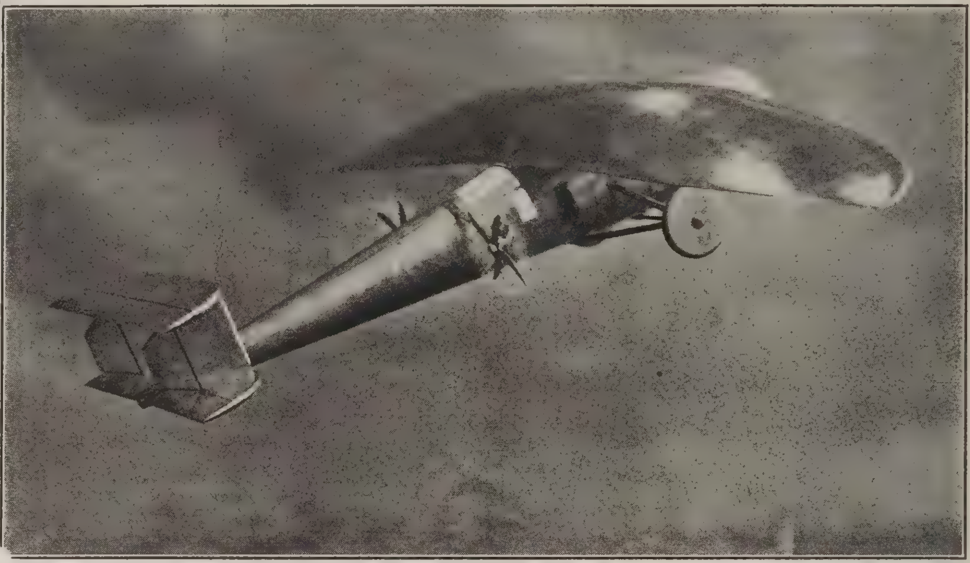
														SERVICE AND UNIT COST						
Aeroplane No.	Gasoline	Grease and Oil	Office Force and Watchmen	Motorcycles, Trucks	Rent, Light, Fuel, Power, Telephone and Water	Miscellaneous	Pilots	Mechanics and Helpers	Repairs and Accessories	Interest on Investment	Departmental Overhead Charge	TOTAL	Gallon of Gasoline	Total Time Run		Total Miles Run	Miles Run per Gallon of Gasoline	Cost per Hour	Cost per Mile
														hr.	min.				
67	....	....	$88.63	$50.89	$14.33	$65.77	....	$381.07	$17.04	$50.00	$77.45	$745.18	......	....		....	......	....	.....
70	....	....	88.63	50.89	14.33	65.77	....	383.19	327.85	25.00*	77.45	1,033.11	......	....		....	......	....	.....
75	$35.84	$7.41	88.63	50.89	14.33	65.77	$36.36	29.73	97.90	21.50*	77.45	525.81	130	4	26	350	2.6	$118.60	$1.50
88	197.65	25.92	88.63	50.89	14.34	65.77	168.82	287.98	812.40	45.18*	77.45	1,835.03	705	20	35	1,980	2.8	89.15	.93
89	77.81	16.28	88.63	50.89	14.34	65.77	118.52	65.68	9.00	13.80*	77.45	598.17	276	14	27	1,340	4.8	41.39	.45
92	88.49	7.72	88.63	50.89	14.34	65.77	19.96	167.51	1,988.76	13.65*	77.45	2,583.17	305	2	26	240	.8	1,061.57	10.76
95	48.04	7.12	88.64	50.89	14.34	65.77	77.45	199.53	12.00	50.00	77.45	691.23	171	9	27	975	5.7	73.15	.71
99	387.37	43.79	88.64	50.89	14.34	65.77	360.48	286.20	101.40	30 00*	77.45	1,506.33	1,371	43	57	3,915	2.8	34.27	.38
101	121.91	18.46	88.64	50.89	14.34	65.77	153.99	161.39	97.50	18.89	77.45	869.23	435	18	40	1,625	3.7	46.56	.53
102	63.97	10.88	88.64	50.89	14.34	65.77	38.38	76.20	35.75	7.86*	77.45	530.63	224	4	41	325	1.4	113.30	1.63
104	128.16	22.60	88.64	50.90	14.34	65.77	134.24	249.17	211.24	18.00*	77.45	1,060.51	455	16	22	1,485	3.2	64.79	.71
106	....	....	88.64	50.90	14.34	65.77	....	170.06	1.75	25.00*	77.45	493.91	......	....		....	......	....	.....
107	20.80	3.20	88.64	50.90	14.34	65.77	....	....	.10	....	77 45	321.20	73	....		....	......	....	.....
201	425.78	71.09	88.64	50.90	14.34	65.77	257.68	255.49	40.75	200.00	77.45	1,547.89	1,499	31	25	2,410	1.6	49.27	.64
202	287.11	44.12	88.64	50.90	14.34	65.77	203.82	271.01	40.70	200.00	77.45	1,343.86	1,032	24	51	1,975	1.9	54.08	.68
204	291.68	48.55	88.64	50.90	14.34	65.77	176.62	277.11	12.00	200.00	77.45	1,303.06	1,145	21	32	1,825	1.5	60.51	.71
206	77.68	14.40	88.64	50.90	14.34	65.77	3.96	200.72	7.00	15.25*	77.46	616.12	265	..	29	35	......	....	.....
Total	$2,252.29	$341.54	$1,506.82	$865.20	$243.75	$1,118.09	$1,750.28	$3,462.54	$3,813.14	$934.13	$1,316.66	$17,604.44	8,086	213	18	18,480	2.2	$82.53	$0.95

Cost per mile, overhead, $0.26; cost per mile, flying, $0.24; cost per mile, maintenence, $0.45.
Planes Nos. 67 to 107, inclusive, De Havilands, equipped with Liberty 12 motors.
Planes Nos. 201 to 206, inclusive, Martins, equipped with two Liberty 12 motors.

*Indicates that plane appears on another report.

OTTO PRAEGER, Second Assistant Postmaster General.

THE ALULA HIGH-LIFT WING



IN our issue of August 16 we briefly referred to a new high-lift wing which has recently been developed in England, and which has aroused widespread interest in aeronautic circles. We are enabled this week to present further data on the subject which we have just received from our London representative.

The Commercial Aeroplane Wing Syndicate, Ltd., who control the patents, have issued a statement in which they present the following facts:

"The illustrated example of a cargo-carrying design using Alula wings is a cantilever monoplane. The wings and fuselage are both constructed of mahogany planking on the principle used in modern flying boat hulls: this simplifies the machine and eliminates the bulk of the metal parts, fabric, etc., and will give great durability, a feature of the first importance in relation to depreciation charges.

"The machine is a non-folder, being designed to dispense with shed costs altogether.

"The method of securing rapidity of loading and unloading cargo will be best appreciated by an examination of the model.

"The crew consists of a pilot carried right forward and a mechanic in charge of the engine room aft. The engines are twin Lions and the machine is designed to fly *and climb* even if one engine breaks down. Reliability of service is assured by this power to fly on one engine and by the superintendence of the engines in flight, coupled with the fact that all work is normally done at half power.

"The design has been prepared on a most conservative basis in all respects: for instance, an allowance of 7½ per cent on all structure weight above the calculated figure has been included, and the factor of safety has been taken as 5 in the calculations, whereas 3 is nearer the ultimate mark for cargo machines; further, a 30 m.p.h. head wind is assumed in calculating the weight of fuel carried. There is, therefore, no doubt that the machine will do considerably better than the figures given by the calculation.

Sizes in Feet

Span	146
Length	84
Height	22
Chord	16
Fuselage diameter	14

Weights in Pounds

Wings	5,100
Fuselage	2,080
Tail	850
Chassis	1,160
Structure	9,190
7½% addition	690
Tanks	550
Engine and Propeller Mountings, Radiators, Silencers, etc.	970
Engines	1,680
Crew	360
Empty weight	13,440
Fuel (London-Paris)	1,660
Cargo (London-Paris)	9,000
Fuel (400 miles)	2,770
Cargo (400 miles)	7,890
Total weight	24,100

Performance

Landing Speed	55 miles per hour
Cruising Speed	72 miles per hour
Climb	410 feet per minute
Climb on one engine	40 feet per minute
Cruising revolutions	.80 of normal
Cruising B.H.P.	.51 of normal
Cruising consumption	243 pounds per hour

Other Particulars

Total weight, pounds	24,100
Total horsepower	920
Surface, square feet	1,870
Pounds per square foot	12.9
Pounds per B.H.P	26.2
Cargo space, cubic feet	1,700
London-Paris Cargo, tons	4
400 miles Cargo, tons	3½
Gliding Angle	1 in 15

Figures Taken in Calculating Cost of Operating

1½ pilots, 2½ mechanics and 2 laborers per machine, and insurance of flying crew, per annum	£2,270
Petrol, 3/- per gallon; oil, 5/- per gallon; giving a combined figure in pence per pound of	5.16
Material reckoned as 1 machine and 1 spare engine, totalling 13,920 pounds, and costing approximately	£13,920*
Depreciation, allowing for replacement of material in	1 year
Insurance equivalent to replacing the material in	1,600 flying hours

Establishment and aerodrome charges are not included, as they vary so much with the size and other conditions of the service. They must, of course, be added to the figures given hereafter.

	London-Paris (240 miles)	400-mile route
Cargo per run	4 tons	3½ tons
Journeys per week	3 double journeys	3 single journeys
Single journeys per year	312†	156
Cargo carried per year	1,248 tons	546 tons

Operating Costs

	London-Paris	400-mile route
Annual cost of running	£30,680	£28,260
Cost per pound carried the distance ....pence	2.6	5.5
Cost per ton-mile	2/0½	2/7

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* This will be much less when a number of similar machines are ordered together.

† This will be much more when a well-lighted route makes night work feasible.

The figure of 1 year for depreciation is unduly conservative for a boat-built structure. A figure of 3 years is a fairer estimate, and gives—

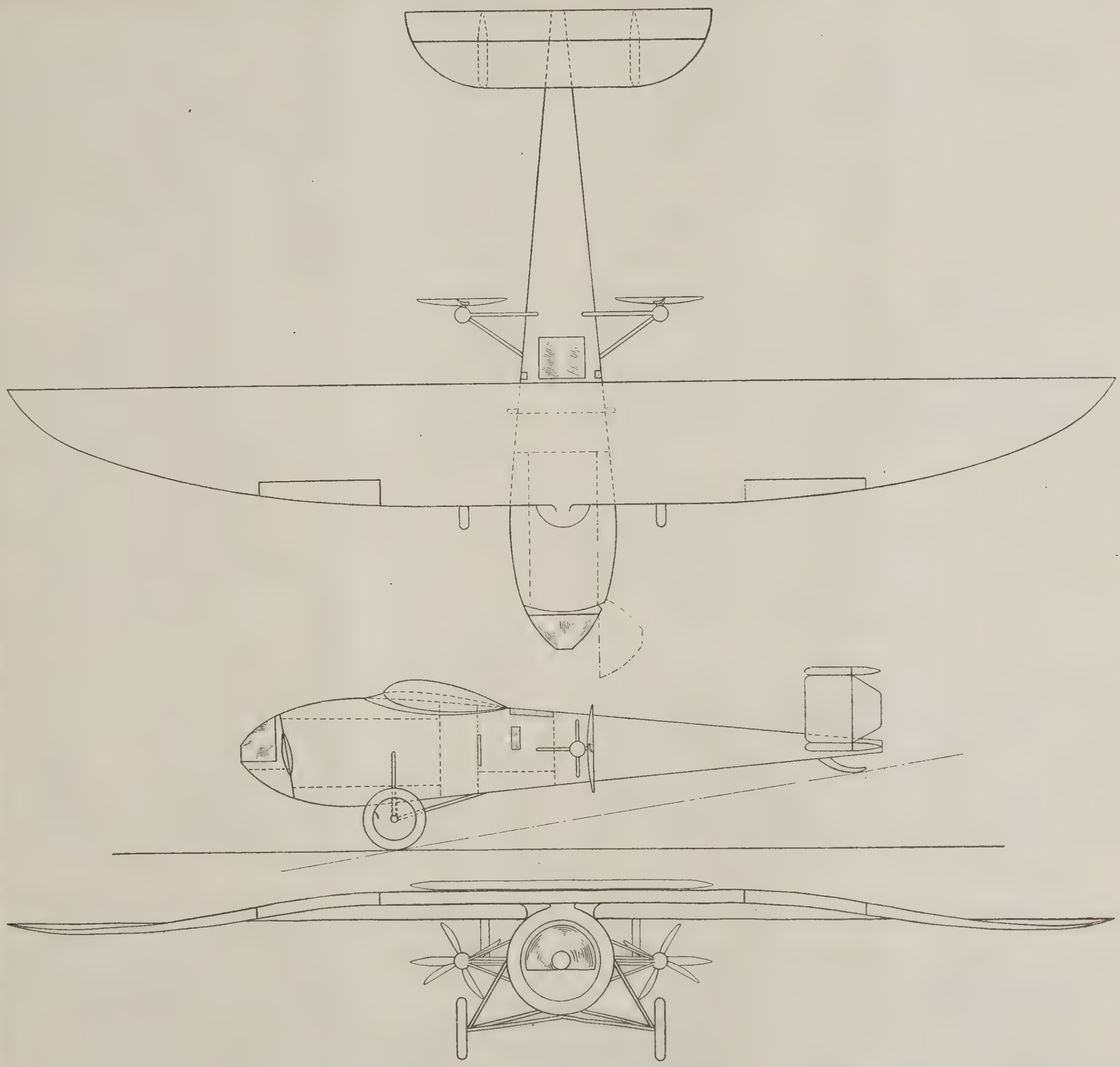
	London-Paris	400-mile route
Annual cost of running	£21,400	£18,980
Cost per pound carried the distance .... pence	1.8	3.7
Cost per ton-mile	1/5	1/9

"As pointed out in the preamble to the description of the "Pelican" 4-ton cargo machine, it is the possibility of economical carriage of goods by air, which alone can open the way to development of aerial travel on anything but a very restricted scale. Unless the goods traffic can be made to cover the cost, aerial mail and passenger transport will remain much too costly to develop, let alone maintain.

"The determining factor in this matter is the main organ of Flight—the *Wing*. No wing at present known holds out the least promise of making the carriage of goods a paying concern (otherwise than of goods of a very special nature and under very special circumstances).

"Although it has not been explicitly stated, this fact must have been recognized, even if only subconsciously, by all designers and others who can be regarded as leaders of the movement, because so far only the carriage of passengers and mails under subsidy have been mentioned as feasible. It has not been recognized that therein does not lie the solution of the problem. The fact has to be faced that we must solve the problem at the other end, and that the only way this can be done is by rendering aerial transport at a *moderate* speed practically possible and commercially remunerative.

"It is well known that in all forms of transport the overall cost of operation (capital, establishment charges, running cost, etc.,) increases roughly with the *cube* of the speed of transport. That is why cargo steamers and goods trains operate at the lowest practicable speeds. Aerial traffic can in no way escape the consequences of this fundamental law. It is not suggested that Aircraft should fly at some 20 miles an hour in order to pay. A best speed will be found, taking air conditions into account, for every particular case. But we contend that for the transport of goods such speeds will be found to be much below the flying speeds of to-day, and speeds of from 60 to 75 miles an hour, according to pre-



SCALE ⅛ INCH = 1 FOOT

PELICAN 4-TON LORRY

vailing weather conditions, will be found to be commercially the most advantageous.

"No known wing of to-day renders this practically possible. A machine fitted with any known wing would have to be of unwieldy dimensions to lift any load worth considering at a speed of 75 m.p.h. Even then the proportion of paying cargo would be low and capital and operating cost high.

"Attention has lately been drawn to 'High-lift' wings. But they cannot solve the problem because they give high lift at a *proportionately greater cost in resistance* than 'low lift' wings. What we gain in lifting power, we lose in the engine power and fuel that have to be provided.

"Nothing but a wing *giving high lift coupled with low resistance* can help us out.

"This can only be obtained in one way; by designing a wing to give rise to a type of air flow known as 'irrotational or two-dimentional.' This type of flow is strictly parallel to the direction of flight. Theoretically, this can be accomplished by a wing of infinite span, an obvious absurdity. In practice, it can only be obtained by providing a wing with properly designed wing tips to obviate the 'end losses' or 'leakage' which reduce the lift of any wing, increase its resistance by wasting energy in vortices and generally speaking, limit us to the use of wings of new camber (or curvature).

"The 'Alula' wing is a new wing *type* which has been evolved by some eight or nine years of patient research work on small scale and full scale and the expenditure of some scores of thousands of pounds.

"First the aerodynamical laws bearing on the problem were investigated. Then the general characteristics of the several features going to form a wing were investigated so that they might be made to act in unison and together obey these laws.

"Finally, a method of designing a concrete wing-shape was evolved, enabling the experimenter to vary all the features of a wing in unison whenever a particular one had to be changed, in such a manner as not to upset their inter-relation.

"This necessitated the creation of a mathematical method of wing-shape design for any desired case. By this method a complete wing can be automatically evolved from any central rib section chosen.

"Remembering the fundamental truth of the saying 'Natura atris magister' it is gratifying to reflect that these shapes closely resemble in every essential particular, those adopted by the most powerful fliers amongst the birds when they spread their wings for soaring or gliding flight.

"An analytical equation, originated by Dr. Norman Piercy, has been of very great assistance in the application of this method, as it enabled the work to be based on mathematical curves instead of on freehand curves, whose rate of variation is always irregular, and which are in the true sense no more 'curves' than a freehand circle is a true circle. The numberless small scale models necessitated by the prolonged laboratory preparation were mostly made by Mr. A. Clarke with consummate skill. After the armistice, the time had come to develop aerial transport and a syndicate was formed to test the new wing-type evolved and give a final demonstration of its value. This syndicate, called the Commercial Aeroplane Wing Syndicate, Ltd., was backed by the well-known pioneer firm in aviation—Messrs. The Blackburn Aeroplane Co., of Leeds, whose resources and experience were placed at the syndicate's disposal.

"An experimental machine was designed and built at Brough (Yorks) by Major F. A. Bumpus. The first straight flights were done near the ground by Major Veal. It soon became apparent that the experiments would be unduly protracted unless a larger staff could concentrate exclusively on the work. Therefore such a special staff was formed, consisting of Mr. Harris Booth and Mr. Copley, who were entrusted with design and constructional work and the problems arising on the aerodynamical side, and Captain S. J. Clinch as pilot, whose lot it was to take up, what was to all intents and purposes a new and unknown machine every time he took the air. This staff was assisted by a small band of untiring workers and it is a pleasure to say that they—as a team—showed that enthusiastic devotion to the cause, without which the manifold and often heart-breaking experimental difficulties could not by now have been overcome.

"Much had to be learned about the effect of the usual structure on the lifting properties of the new wing-type, as also about the effect of the propeller slipstream. Also a new system of lateral control had to be devised and tested at the same time as the new wing. Each had its own infantile troubles and frequently it was a toss up whether a certain effect was due to one cause or another. In consequence much more time was absorbed in the full scale experiments than was at first anticipated.

"We had the satisfaction of evolving a control, which by a single movement of the control-lever causes the machine to bank and steer correctly at the same time. This is the result of the fact that the resistance is increased on the side of the wing where the lift is reduced.

"This phenomenon stamps this form of control as fundamentally new.

"By a final sustained effort, the experiments were brought to a satisfactory conclusion and an officially observed test successfully passed just in time to make publication during the Aero Show possible. This announcement is being made in the belief that it may be a piece of welcome and heartening news to the aircraft industry and to all those who have at heart the development of aerial transport—which will benefit mankind in so many ways.

"Finally, it may be stated that the Commercial Aeroplane Wing Syndicate do not appear on the scene as competitors to the industry in any way. They do not contemplate building machines under any circumstances other than for further experiments, nor do they propose to exercise a monopoly or to permit others to do so. On the contrary, they appreciate that their true interest lies in the closest co-operation with the industry and in placing their accumulated experience and the advice of their technical staff at the industrial designer's disposal. They realize that their true interest lies in the universal adoption of the new wing-type and propose to follow the policy best calculated to achieve that end."

Tests at East London College on Alula

Wing No. 328.8 (Double Arched Model), 4" x 36" at 40 feet per second.

Angle of Incidence, Degrees	Lift Coefficient	L/D	Center of Pressure Coefficient
0	.191	7.0	.575
1	.241	10.5	.496
2	.290	13.3	.447
3	.338	15.8	.432
4	.386	18.3	.418
5	.432	20.6	.406
6	.476	22.2	.395
7	.521	22.85	.398
8	.566	22.9	.388
9	.621	22.5	.381
10	.660	21.8	.378
11	.709	20.9	.371
12	.761	19.85	.365
13	.799	18.8	.350
14	.823	17.5	.340
15	.827	16.1	.335
16	.822	14.6	.335
17	.814	12.9	.340
18	.800	10.8	.352
19	.784	8.6	.369

BOOK REVIEWS

Aeroplane Structures: By *A. J. Sutton Pippard, M. Sc., Assoc. M. Inst. C. E.,* and *Capt. Laurence Pritchard, R. A. F.* With a preface by L. Bairstow, F. R. S. With twenty-one plates and 273 figures.

The work contains the latest information on this highly important branch of aeronautical engineering, and gives complete methods of calculation for the modern aeroplane structure. The book also contains much new matter on the theory of structures.

Contents: Introductory, The Mechanics of Flight, The Structure of an Aeroplane, The Detail Structure of an Aeroplane, The Evolution of an Aeroplane in Flight, Leads on an Aeroplane in Flight, The Elastic Properties of Materials, Framed Structures, Geometrical Properties of Plane Sections, Bending Moments, Shear Forces and Stresses in Beams, Forces on Main Plane Structure, Internal Forces in a Fuselage, Forces and Loads upon Control Surfaces, Landing Loads, The Partially Disabled Aeroplane, Some General Considerations in Aeroplane Design, Detailed Design, Detailed Design Struts, Detailed Fitting Design, Testing, Destruction Tests, Principle of Least Work.

Copies can be purchased at the Aeronautic Library, 299 Madison Avenue, New York City, N. Y. Price $6.40 postpaid.

Tin, Sheet-Iron and Copper-Plate Worker, By *Leroy J. Blinn.*

This volume is a new and enlarged edition of one of the most popular books on metalplate work ever published in this country. It has helped many to solve their everyday problems in that line and should be within reach of every metal worker for ready reference. With it, you need never be at a loss to describe a pattern, to solve a point in practical geometry or to know the right varnish or cement to use, or the strength of any material.

The present edition has been enlarged by the addition of many new pattern problems which deal more particularly with triangulation and modern skylight work.

A noteworthy feature is the treatment of metallic alloys and solders which gives to the worker just the information he very often needs; the more important seams or joints used in plate work and the various ways of making them are illustrated and described. There are hints for tempering and for other operations and manipulations for everyday use in the workshop, also numerous useful tables which furnish ready aid and save much time. Valuable receipts of all kinds round out a most complete work. Experts have carefully gone over the receipts and tables to insure their accuracy.

Partial summary of the contents:

Rules for Describing Patterns. Practical Geometry. Mensuration of Surfaces. Mensuration of Solids and Capacities of Bodies. Tables of Weights, etc. Tables of the Circumferences of Circles to the Nearest Fraction of Practical Measurement. Practical Receipts. Varnishes-Miscellaneous. Important Metallic Alloys. Miscellaneous Receipts. Strength of Materials.

This book can be obtained at the Aeronautic Library, Inc., 299 Madison Ave., New York City. Price $3.30 postpaid.

PRELIMINARY CHOICE OF A WING SECTION

By W. F. GERHARDT, B. C. BOULTON and L. V. KERBER

Aeronautical Engineers, Engineering Division, Air Service

The choice of the wing section and area which will give the desired performance in steady motion is the first step to be made in the aerodynamical design of an aeroplane. The determination of the best combination of section and area is a complicated calculation, for it is impossible to select the section independently of the area in securing the *limit* performance for a given type of aeroplane. Certain criteria can be applied, however, which allow the elimination of the poor sections and the selection of a few predominantly good profiles for certain types of aeroplanes. These criteria, while not sufficiently fine to differentiate aerofoils of nearly the same quality, constitute an accurate method of choosing the most valuable.

I. Criteria for Performance

For such a preliminary evaluation it is sufficient to consider the sections applied in turn to a single aeroplane of constant weight, area, power and parasite drag. Certain criteria may thus be developed which permit evaluation of the properties of the sections for high speed, climb, ceiling, etc.

The assumption of constant area is a first approximation. For final choice the area must be considered as variable, and selection made by means of a series of performance estimates.

(a) *High Speed*

For level flight at high speed:

$$P = \delta\,(K_x + c)\,A\,V^3$$

where P is the power of the motor
K_x is the drag coefficient of the wings
c is the parasite coefficient per unit area
A is the wing area
δ is the air density
V is the speed—in this case, high speed

or

$$P = \delta\,K_y\,\frac{(K_x + c)}{K_y}\,A\,V^3$$

and

$$V = \left\{\frac{P}{\delta\,K_y\,A}\right\}^{1/3}\left\{\frac{K_y}{K_x + c}\right\}^{1/3}$$

It is evident from this equation that if two airplanes, differing only in aerofoil section, be flying at the same value of K_y, the airplane with aerofoil of higher K_y/K_x at that condition will not need all its power to maintain the speed or it may be driven at a higher speed for the same power. A preliminary valuation of aerofoils for high speed is value of K_y/K_x at the K_y reached in flight.

(b) *Landing Speed*

The landing speeds of two airplanes differing only in aerofoil sections are inversely proportional to the square roots of the maximum values of the lift coefficients of the sections.

$$V = \left\{\frac{W}{\delta\,K_{ym}\,A}\right\}^{1/2}.$$

$$= \left.\frac{W}{\delta A}\right\}^{1/2}\left\{\frac{1}{K_{ym}}\right\}^{1/2}$$

The maximum unit lift has been listed therefore in Table I.

(c) *Speed Range*

Speed range is defined as the ratio of high to landing speed. Since landing speed is inversely proportional to the square root of the lift coefficient, and high speed to the cube root of the L/D at the value of K_y usual to high speed, the speed range is proportional to product of these figures:

$$V_m \propto \left\{\frac{1}{K_{ym}}\right\}^{1/2}$$

$$V \propto (L/D)^{1/3}$$

$$\frac{V}{V_m} \propto (K_{ym})^{1/2}\,(L/D)^{1/3}$$

The values of this quantity are listed in Table I, for $K_y = .0008$ and .0004. It will be observed that the aerofoils are not of the same value in speed range both for low speed and high speed planes.

Due to the fact that this speed range factor is a first approximation, one aerofoil should not be chosen above another by reason of a small favorable difference, for finer analysis may reverse the result. However, large differences shown by this method may reasonably be taken as indicative of comparative merits.

(d) *Ceiling*

The maximum altitude or minimum density which an aeroplane can reach is a complex function of its motor power and drag characteristics. In his paper on "Supercharging" Dr. de Bothezat shows that the ceiling density is expressed

$$\delta_c = \left(\frac{W\,\delta_0^{2/3}}{P_0^{2/3}\,A^{1/3}\,\eta^{2/3}}\right)\left(\frac{K_x + c}{K_y^{3/2}}\right)^{2/3}$$

where η is the average propeller efficiency.

In the comparison being made the airplane with aerofoil possessing highest value of $K_y^{3/2}/K_x$ will give the highest ceiling. This quantity is given in Table I.

$$\frac{K_y^{3/2}}{K_x}$$

(e) *Climb*

The rate of climb is also a complex function of the power and drag characteristics.

$$R = \frac{\eta P_0}{W} - \left[\left(\frac{P}{\delta_0\,A}\right)^{1/2}\left(\frac{K_x + c}{K_y^{3/2}}\right)\right]$$

As long as the power and area are considered constant the rate of climb may be taken as dependent solely on the quantity $\frac{K_x}{K_y^{3/2}}$ and in the first approximation is maximum when $\frac{K_y^{3/2}}{K_x}$ is a maximum. This quantity is, therefore, a criterion of climb also.

(f) *Cruising*

In an analysis of the cruising problem, Lt. Col. Dorand shows that the maximum radius is obtained at an angle of attack of $\frac{K_x + c}{K_y}$ minimum. So long as c is actually constant the aerofoil which has the highest maximum $\frac{K_y}{K_x}$ will give best cruising radius K_y/K_x maximum is therefore listed as a criterion for cruising radius.

TABLE I.

Characteristics of Aerofoils

Aerofoil	Landing Speed (K_{ym})	Cruising (Max. L/D)	High Speed (Scouts) L/D at $K_y = .0004$	Speed Range $(K_{ym})^{1/2} \times (L/D)^{1/3}$ $K_y = .0004$	High Speed (Large Airplanes) L/D at $K_y = .0008$	Speed Range $(K_{ym})^{1/2} \times (L/D)^{1/3}$ $K_y = .0008$	Ceiling, Climb $\frac{K_y^{3/2}}{K_x}$ (max.)	Per Cent of Chord: C.P. Movement K_y = .0008 to max. fwd. position	Per Cent of Chord: Wing Depth at 10% chord	Per Cent of Chord: Wing Depth at 15% chord	Per Cent of Chord: Wing Depth at 70% chord
1	2	3	4	5	6	7	8	9	10	11	12
U' S. A. 1	.00292	16.7	6.5	.1000	12.2	.146	.660	15	5.72	5.90	4.38
2	.00339	15.7	4.8	.0985	8.6	.120	.701	23	4.87	5.60	4.35
3	.00324	16.4	3.4	.0855	9.7	.122	.712	24	4.83	5.70	4.44
4	.00364	15.9	3.4	.0905	7.4	.118	.681	24	5.01	5.60	4.38
5	.00328	16.2	4.3	.0930	11.2	.129	.671	22	5.63	6.20	4.47
6	.00297	17.2	5.6	.0965	12.4	.126	.726	20	4.50	5.00	3.59
8	.00317	13.6	3.2	.0830	7.5	.110	.625	.....	12.30	13.70	10.65
9	.00339	15.5	5.4	.1020	9.9	.125	.665	.....	8.22	9.10	7.12
10	.00287	16.4	5.0	.0920	13.7	.129	.622	.....	[illegible]	[illegible]	5.38
11	.00285	16.6	5.4	.0912	11.8	.122	.643	.....	5.85	6.80	5.00
1[illegible]	.00326	13.6	3.0	.0825	7.4	.112	.625	.....	12.27	13.90	10.63
14	.00286	16.4	6.8	.1010	12.3	.123	.652	13	5.42	5.93	5.02
15	.00300	16.5	6.6	.1080	13.4	.130	.658	15	6.11	6.76	5.32
16	.00252	18.8	8.8	.1030	18.6	.129	.629	6	5.78	6.18	4.77
17	.00275	16.0	7.8	.1040	14.7	.128	.630	8	5.73	6.38	4.90
18	.00276	15.4	6.8	.1000	13.1	.124	.611	13	6.38	7.48	5.62
19	.00259	16.1	7.8	.1010	14.0	.122	.642	10	4.52	4.80	3.70
20	.00219	15.7	10.2	.1010	15.0	.116	.588	12	5.86	6.21	4.83
21	.00231	15.1	8.2	.0980	13.4	.114	.613	8	6.37	7.60	5.60
22	.00297	16.1	7.6	.1070	13.3	.129	.642	16	7.80	8.75	4.50
23	.00259	17.1	8.2	.1040	15.2	.128	.675	17	5.00	5.68	4.17
24	.00270	16.6	8.0	.1040	12.9	.122	.678	20	5.65	6.56	4.78
25	.00316	15.4	5.2	.0970	10.5	.123	.641	21	7.58	8.10	6.74
26	.00310	17.0	6.2	.1020	13.0	.125	.662	21	8.17	9.25	6.90
27	.00359	16.2	5.0	.1020	10.8	.132	.677	15	9.17	10.40	7.90
28	.00275	15.8	6.0	.0960	11.2	.117	.678	26	9.99	11.66	7.94
29	.00331	14.4	5.4	.1010	10.0	.124	.643	30	10.01	11.79	8.88
U. S. A. T. S. 1	.00296	10.5	4.8	.0920	7.5	.107	.519	.....	16.60	20.10	16.30
2	.00339	12.2	5.3	.1010	8.8	.120	.576	21	12.40	14.80	13.60
3	.00431	12.6	2.2	.0855	4.8	.111	.630	.....	8.70	10.00	8.50
4	.00435	12.0	2.2	.0860	5.2	.114	.612	.....	8.20	9.30	7.80
5	.00386	12.8	4.6	.1030	8.9	.128	.595	34	13.20	15.40	10.60
6	.00413	13.0	2.4	.0865	6.0	.117	.613	.....	11.40	13.70	9.00
7	.00392	12.8	2.4	.0840	5.8	.112	.691	.....	9.60	11.10	11.20
8	.00405	12.7	3.0	.0915	8.2	.128	.621	.....	11.90	13.80	9.50
9	.00402	12.2	2.0	.0800	5.0	.109	.592	.....	12.30	14.40	11.40
10	.00442	12.9	2.4	.0895	5.6	.118	.640	.....	11.50	13.50	10.80
11	.00328	14.0	2.3	.0760	6.6	.108	.640	.....	8.40	10.20	9.20
13	.00330	13.3	4.6	.0950	8.2	.117	.600	20	11.10	12.60	9.00
Durand 13	.00408	13.3	2.8	.0900	6.5	.119	.627	.....	10.20	12.00	10.40
R. A. F. 3	.00348	15.6	5.3	.1010	8.8	.121	.698	42	4.78	5.40	3.50
6	.00306	16.7	5.2	.0960	11.9	.126	.663	17	5.60	6.30	5.35
14	.00326	15.4	4.6	.0950	11.0	.127	.637	15	4.70	5.30	4.80
15	.00260	16.8	9.6	.1080	16.5	.128	.615	19	6.05	6.31	4.80
17	.00280	14.2	5.7	.0950	11.9	.121	.592	8	6.31	6.77	5.38
A. E. G. 1	.00302	15.4	5.3	.0960	11.3	.124	.643	5	5.60	6.20	2.20
2	.00330	15.5	5.8	.1030	11.0	.128	.644	7	6.10	7.00	2.90

All the data listed in this table are based on wind tunnel tests made at the Massachusetts Institute of Technology. The same air speed of 30 M. P. H. was maintained in all tests. All models were 18 x 3 in. in size. Therefore, these data are comparable. Results from British and French tests are not included because they are not comparable to the same degree.

The data on all the U. S. A. thick sections are more optimistic than the data on the U. S. A. T. S. 2, 5 and 13 by 3 to 4 per cent. When these tests were run (Sept. 14, 1918) the tunnel was not properly calibrated. Later (March 12, 1919) the tests on the U. S. A. T. S. 2, 5 and 13 were re-run and the results were 3 to 4 per cent lower than before.

The data given on the R. A. F. 15 wing are for what is known as the M. I. T. section rather than the true British or N. P. L. section. The lift on the latter is larger by 3.5 per cent than the lift on the section with the M. I. T. ordinates, but L/D for the M. I. T. section is considerably higher, especially at low angles.

II. Structural Critical

A minimum c.p. movement on the aerofoil is desired in order that the load may be at all times well distributed between the spars. A large movement may be a sufficient cause for the rejection of a section even if the performance characteristics are satisfactory. The c.p. travel from the most forward position to $K_y = .0008$ has been computed for the aerocoils listed, This is not the range applicable to all types of planes, but gives a good comparative figure.

Spar depth is a very important consideration. It is possible to secure very desirable aerodynamical characteristics with very thin or very highly cambered sections which would be entirely inapplicable to any but the most lightly loaded aeroplanes. For most, conventional two-spar designs the usual spar locations are at about 10 to 15 per cent and 70 per cent of the chord. The spar depths of the sections have therefore been listed in Table I Other things being nearly equal, the section with the greatest spar depth is to be recommended.

III. Performance Requirements

It is rarely the case that an aerofoil is selected for a single performance characteristic. Few airplanes require predominantly high speed, climb or ceiling, but rather varying combinations of these qualities.

In Table II the 15 Air Service Specification types have been divided into six general classes with the average performance requirements shown.

It is obviously impossible for one rigid aerofoil to be best "all round". Only by variable area and camber arrangement could such a condition be more nearly fulfilled. The choice must be made rather as a compromise of performance characteristics with requisite spar depth and reasonable c.p. movement.

IV. Sections Recommended

On the basis of the above figures the sections given in Table 2 are recommended as suitable for the six classes. It will be observed that in some cases two sections are listed which indicates that their characteristics are very similar and little choice is possible. The complete characteristics and ordinates for these sections are given in Table III.

In a pursuit airplane speed must be combined with fast climb and high ceiling. The wing section must therefore be somewhat of a compromise between an extremely high speed and high climb wing. There are, however, different types of pursuit machines and the relative importance of speed, climb and maneuverability varies with the special service for which the aeroplane is intended. Where ability to maneuver is to be strongly emphasized, a section possessing high lift characteristics is employed. The U.S.A.27 is well adapted to this use, and the depth afforded for spars makes it suitable for internally braced construction. This section is also very efficient except for extreme high speed. It is well suited to a night pursuit airplane in which high speed is not so important as climb, low landing speed and maneuverability. For a pursuit machine that would be required to land in restricted space, as in mountainous regions or on roads, it is essential to use as high a lift section as possible in order to reduce the area and hence the span. For this purpose also, the U.S.A.27 is the best wing. The U.S.A.16 has better climb and ceiling characteristics than the R.A.F.15, as is indicated by a higher value of $\frac{K_y^{3/2}}{K_x}$, and is therefore to be chosen if more importance is to be attached to climb and ceiling than to high speed. U.S.A. T.S.5 is too thick for a pursuit ship, but is mentioned to indicate the best that can be done in adapting thick sections to speed work. The same sections are adapted to class 2, because the same requirements apply except to a lesser degree.

For both classes 3 and 4 the U.S.A.5 was selected as the best thin section. It combines low speed with good climb and high efficiency at cruising speed, characteristics which are of more importance than high speed. Since a low landing speed is very desirable with airplanes of these types, and since also it is important to keep the span and hence the area as small as possible, the large K_y of U.S.A.5 section is one of the most important factors to be considered. However, for airplanes in which high speed is of more importance than the considerations discussed above, the U.S.A.15 section is to be recommended. Its structural characteristics are superior to those of the U.S.A.5. In these types of airplanes it is very desirable to use a single instead of a double bay cellule, and the greater spar depth of the U.S.A.15 section may make this possible in cases where, with the U.S.A.5 section, it would be impracticable.

TABLE II.
Classification of Airplanes for Wing Selection

Class	Military Type	Landing Speed	Climb (Ground)	Ceiling	High Speed (Ground)	SECTIONS			Commercial Type
						Thin	Intermediate	Thick	
I	Pursuit 1, 2, 3, 5	60	1,700	25,000	150	R. A. F. 15 U. S. A. 16	U. S. A. 27	U. S. A. T. S. 5	
II	Observation Fighters, Small Bombers, 8, 9, 10, 11	55	1,000	20,000	120	R. A. F. 15 U. S. A. 15 U. S. A. 16	U. S. A. 27	U. S. A. T. S. 5	Mail, Passenger
III	Messenger	40			100	U. S. A. 5	U. S. A. 27		Single-seater Sport
IV	Training, 14, 15	40	900	18,000	105	U. S. A. 5 U. S. A. 15	U. S. A. 27	U. S. A. T. S. 5	Training, sport, passenger and mail
V	Ground Attack 4, 6, 7	50			100	U. S. A. 15	U. S. A. 27	U. S. A. T. S. 5	
VI	Large Bombers, 12, 13	50	650	13,000	100	U. S. A. 5 U. S. A. 15	U. S. A. 27	U. S. A. T. S. 5	Express, passenger and mail

It will be observed that the only intermediate and thick sections chosen for any class were the U.S.A. 27 and the U.S.A. T.S. 5. An examination of Table 2 will show that these are far superior to the other sections in the groups of intermediate and thick wings for all except very special work. For small or moderate sized machines at least, these wings will be too deep to be economical unless at least partially internal braced construction is used.

In the large designs of classes 5 and 6 advantage could be taken of the greater spar depths to increase the length of the bays, thereby reducing the interplane bracing. In all types of aeroplanes, but particularly in larger bombers and express or passenger machines where the value of the airplane is almost directly proportional to the useful load carried, the advisability of selecting a high lift section becomes apparent. For instance, the U.S.A. 27 has a K_{ym} 42 per cent greater than the U.S.A. 16, and therefore the same wing area can support a proportionally larger load. But, as the total useful load for an aeroplane is rarely as much as 40 per cent of the gross weight of the machine, the use of a high lift wing would about double its net carrying capacity. This is, of course, partly offset by the fact that the ceiling and the climb, which are closely proportional to the power loading, would be considerably affected by increasing the gross weight of the machine. In commercial aeroplanes this is not as important as in military types. The change in the high speed, moreover, would not be great. In commercial machines and long range bombers where economy in operation and large radius of action are more important than high speed, the maximum L/D is the chief criterion, provided the c.p. travel and the spar depth are reasonable. For bombers, both U. S. A. 5 and 15 are recommended. The greater maximum lift coefficient of the U.S.A. 5 permits the wing area to be 9.5 per cent less than with the U.S.A. 15 section, with the same landing speed and closely the same ceiling. In the Bothezat formula for ceiling density it should be noted that the ceiling is closely proportional to the cube root of the area and to the two-thirds power of $K_y^{3/2}/K_x$. Therefore, within comparatively narrow limits this formula may be used to compare the ceilings given by different wings when the wing areas are adjusted so as to give the same landing speed in each case. Since the efficiency at cruising speed, and the speed range of these two wings are nearly the same, the U.S.A. 5 section is recommended as a good alternate to the U.S.A. 15, provided the structural proportions of the aeroplane are such that the smaller spar depth afforded by the U.S.A. 5 is sufficient.

There are also types of machines which are designed for special purposes, and an all-round wing is not required. In a racing aeroplane the value of L/D at $K_y = .00035$ is almost the sole measure of the suitability of the wing. In a machine intended for very high ceiling, maximum value of $\frac{K_y^{3/2}}{K_x}$ is the important factor. For an "all-purpose" aeroplane of moderate size the U. S. A. 15 is recommended as the best "thin" section from both an aerodynamical and structural point of view.

V. General Conclusions

For preliminary evaluation of aerofoils the above analytical tests of the data suffice to select those best adapted to each class of aeroplane. Finer comparison must be made by a series of performance predictions.

It is evident that of the numerous sections developed very few are really valuable. This is to be expected, owing to lack of theoretical laws for aerofoil design.

In view of the excellent properties of U.S.A. 27, it is evident that further work should be done on the development of such sections.

TABLE III
U. S. A. 5
M.I.T. Mar. 17, 1917. Velocity—30 M.P.H. Model—18" x 3" Brass

CHARACTERISTICS				ORDINATES		
i	Ky	L/D	C.P.	Distance from L.E.	Lower Ordinate	Upper Ordinate
— 4	—.000326	— 1.58	....	0.00	.62	.62
— 2	.000346	3.64	.753	1.25	.13	2.10
0	.000910	12.28	.498	2.50	.03	3.03
2	.001355	15.72	.415	3.75	.00	....
4	.001740	15.98	.348	5.0	.03	4.40
6	.002120	14.80	.327	7.5	.25	5.40
8	.002470	13.52	.315	10.	.57	6.20
10	.002870	12.08	.303	20.	1.55	7.92
12	.003130	10.84	.300	30.	2.02	8.30
14	.003285	9.25	.288	40.	2.17	8.14
16	.003205	7.63	.298	50.	1.96	7.55
18	.003150	4.57	.330	60.	1.56	6.75
				70.	1.16	5.63
				80.	.76	4.24
				90.	.55	2.52
				100.	.25	.25

Radius L.E. = .36
Radius T.E. = .25

TABLE III (*Continued*)
U. S. A. 15
M.I.T., Nov., 1917. Velocity—30 M.P.H. Model—18" x 3" Alum.

CHARACTERISTICS				ORDINATES		
i	Ky	L/D	C.P.	Distance from L.E.	Lower Ordinate	Upper Ordinate
— 4	—.00035	— 2.8	....	0.00	1.06	1.06
— 2	.00008	1.4	....	1.25	.46	2.56
0	.00058	9.97	.480	2.50	.33	3.44
2	.00108	15.50	.407	5.0	.15	4.80
4	.00147	16.50	.353	7.5	.03	5.58
6	.00183	15.25	.330	10.	.00	6.11
8	.00220	13.95	.320	15.	.12	6.88
10	.00257	12.35	.310	20.	.33	7.28
12	.00290	11.30	.303	30.	.86	7.61
14	.00301	9.43	.297	40.	1.00	7.55
16	.00286	4.98	.340	50.	.72	7.11
				60.	.28	6.36
				70.	.00	5.32
				80.	.11	3.90
				90.	.23	2.50
				100.	.50	.83

Radius L.E. = .51
Radius T.E. = .20

TABLE III (*Continued*)
U. S. A. 16
M.I.T., Oct. 15, 1917. Velocity—30 M.P.H. Model—18" x 3" Brass.

CHARACTERISTICS				ORDINATES		
i	Ky	L/D	C.P.	Distance from L.E.	Lower Ordinate	Upper Ordinate
— 2	—.00003	— 0.5	.61	0.0	.29	.29
0	.00035	7.5	.39	2.5	—.64	2.99
2	.00092	18.9	.335	5.0	—.76	3.88
4	.00135	16.7	.315	7.5	—.83	4.52
6	.00170	15.0	.300	10.	—.83	4.95
8	.00209	13.7	.290	15.	—.76	5.42
10	.00241	11.6	.285	20.	—.51	5.67
12	.00252	7.0	.300	30.	—.06	5.86
14	.00247	4.7	.330	40.	.00	5.74
16	.00234	3.5	.37	50.	—.19	5.29
				60.	—.70	4.65
				70.	—.76	4.01
				80.	—.70	3.25
				90.	—.45	2.23
				100.	.43	.43

Radius L.E. = .57
Radius T.E. = .43

(*Continued on page* 849)

(*Continued from page* 831)

fendant Charles Jerome Edwards, in the chair would not allow its consideration, without giving any reason therefor. **That again at the meeting of said Board of Governors held July 28, 1920, at which meeting the defendant Charles L. Poor was in the Chair, the said Poor absolutely and arbitrarily refused to allow any consideration to be given to said action or to discuss any phase of it by said Board.**

That as a result of the aforementioned investigation of the said American Flying Club, deponent ascertained that said Club was operated at an annual loss of upwards of $50,000—that it cost $40,000 in salaries per year to conduct said club and over $30,000 in rental, taxes, light, laundry and such clubhouse expenses. That the membership of said club numbered considerably less than one thousand and that the dues from such members barely paid the aforesaid salaries, leaving a yearly deficit of $50,000.

Deponent further states that these said defendants, Charles Jerome Edwards, Charles L. Poor, and James A. Blair, Jr., and each of them, refuse to give any information concerning the financial status of said American Flying Club or to discuss the same. That likewise deponent is informed that other members of said Board of Governors have likewise been refused such information and annexes hereto as Exhibit B. a letter which deponent received from one, Charles J. Glidden, in connection therewith.

That under date of July 20, 1920, the said Manufacturers Aircraft Association sent out a notification of the personnel of its officers, copy of which is annexed hereto and marked Exhibit C.

That said defendants, Charles Jerome Edwards, Charles L. Poor and James A. Blair, Jr., caused noticed and proxy forms to be printed secretly and in violation of the constitution and by-laws of the Aero Club of America, for the purpose of getting up a fake meeting which they will misrepresent as being a duly authorized and called meeting of the Aero Club of America, at which meeting they and their confederates in the conspiracy to ruin the Aero Club of America would present proxies obtained by misrepresentation and would attempt to secure control of the Aero Club of America by alleging that said proxies give them the power to abolish the Board of twenty-four Governors of the Club, who have been duly and regularly and properly elected by the membership of the Club at annual meetings.

That to carry out their scheme to abolish the present Board of Governors of the Aero Club of America, said Charles Jerome Edwards, Charles L. Poor and James A. Blair have by misrepresentations caused themselves to be appointed on a committee and that notwithstanding the fact that said Committee was not given powers or authority or instructions to propose changes of by-laws or constitution of the Aero Club of America, they claim and have assumed unto themselves, in violation of the Constitution and by-laws of the Club, the power to abolish the present Board of Governors of the Club and deprive Governors and the membership of the Club of the Constitutional rights invested in them by the constitution and by-laws of said Club and have caused the printing of proposed amended Constitution and By-Laws for the Club, copy of which is appended herewith, which contains vicious provisions drawn for the purpose of making possible the abolishing of the present Board of Governors of the Club and deprive the Governors and membership of the Club of the constitutional rights invested in them by the constitution and by-laws of said Club, to wit:

> "CHAPTER II
>
> Elections.
>
> Section 1. The terms of office of all officers, governors and committees elected or appointed prior to August 16, 1920, shall expire at the conclusion of the Special Meeting of the Club of that date, and new Governors shall be elected at such Special Meeting, without nomination as hereinafter provided for in Section 5 of this Chapter, for such terms as may be specified in the election.
>
> ---
>
> Section 6. The President and the Vice-Presidents shall be elected by the Board of Governors at a meeting held on August , 1920, and shall hold office until the next annual meeting of the Club."

That said scheme to hold a fake and illegal meeting and other schemes for ruining the Club are being carried out without the knowledge, approval or authority of and during the absence in Europe and elsewhere of the President of the Club and the following Governors and officers of the Club: Brigadier-General Robert K. Evans, U. S. A.; Colonel Jefferson DeMont Thompson; Major Granville A. Pollock; Major F. L. V. Hoppin; Rear-Admiral Bradley A. Fiske, U. S. N.; Major A. B. Lambert, U. S. A.; Colonel Henry B. Joy, U. S. A.; Commodore Louis D. Beaumont; Alan R. Hawley; Allan A. Ryan; Alberto Santos-Dumont; John Hays Hammond, Jr.; Geo. M. Myers; Henry A. Wise Wood; Robert M. Graves, and R. A. C. Smith, and that as these gentlemen and deponent are members and officers of the Club, in good standing, they are privileged to know and it is their legal right to expect that they be advised of any proposed changes in the Constitution of the said Aero Club and as provided for in the said By-Laws and Constitution of the said Aero Club. General Evans who called on deponent on July 21st, 1920, authorized deponent to represent him and vote on his behalf in any Aero Club of America matters requiring his vote. Major Granville A. Pollock, another member of the Board, has given his proxy to Major Charles J. Glidden. Other members of the Board have advised deponent that they have not been advised about the scheme which said Edwards, Poor and Blair are attempting to put into effect so as to abolish the Board of Governors and deprive the Governors and membership of the Club of the Constitutional rights invested in them by the Constitution and By-Laws of said Club and obtain control of the Club thereby.

That the action of said Edwards, Poor and Blair in having printed and circulating notices and proxy forms for said fake meeting, is in direct violation of Article VII, Sections 1 and 2 of the Constitution of the Aero Club of America, which reads, as follows:

> "ARTICLE VII
>
> Amendments.
>
> Section 1. The Constitution may be amended only by a vote of two-thirds of the members present in person or by proxy at a regular or special meeting called for that purpose.
>
> Section 2. No proposition to amend this constitution shall be acted upon at any meeting of the Club unless it shall have presented in writing to the Secretary, signed by at least twenty-five members, and a notice embodying the purport of the proposed amendment shall have been sent to each member of the Club in the call for such meeting, which notice shall be sent at least eight days prior to the date of proposed meeting."

Deponent through having atended all the meetings of the Board of Governors of the Club, knows that no application for amendments has been presented to the Secretary of the Club as provided for by Article VII of the Constitution prior to the said actions and activities of said defendants in the printing of said proxies and notices of meeting to be called as aforesaid.

Sworn to before me this
30th day of July, 1920. (*signed*) *Henry Woodhouse.*
(signed) John J. Haley,
Notary Public, New
York County No. 8.

Letter Sent by Flying Club to Colonel Barker to Secure His Assistance In the Insidious Scheme to Damage the Aero Club of America, and Referred to the Aero Club by Colonel Barker:

December 20th, 1919.

A New York newspaper yesterday published a dispatch from Paris to the effect that Mr. Cortlandt Field Bishop, Vice-President of this Club and Father and First President of the Aero Club of America, had there filed a protest against further recognition of the Aero Club of America as representative of the Federation Aeronautique Internationale in the United States. A hearing on this question raised by Mr. Bishop is to be held in Paris on January 6th, 1920.

I am writing you as a member of the Club to urge you to cable to:

Prince Roland Bonaparte, President
Federation Aeronautique Internationale,
Paris, France,

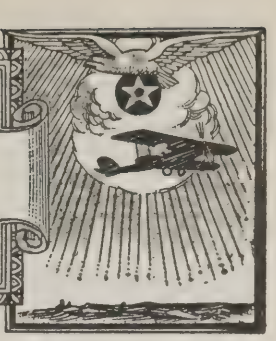
endorsing the protest of Mr. Bishop. All of the Aeronautical manufacturers of America are represented in this Club. Practically all the Air Service officers of Washington and the aviators who served at the front are enrolled members. Pilot's clubs in various cities of the United States have severed their affiliations with the Aero Club and have petitioned this Club for recognition.

The American Flying Club, containing as it does, the flying men of this country should co-operate most cordially with the European clubs of like character. It will be of inestimable benefit to American aviation to secure the affiliation of the Federation Aeronautique Internationale. The American manufacturers can aid Mr. Bishop in his mission by their prompt action in sending a cablegram to the President of the Federation Aeronautique Internationale in Paris, stating that its representative in America should be the American Flying Club.

Unanimous and immediate co-operation of the manufacturers it is believed, will demonstrate to the officers of the

(*Continued on page* 848)

NAVAL and MILITARY · AERONAUTICS ·



New York-Alaska Planes Near Nome

Washington.—The army flying expedition from New York to Nome, Alaska, was expected to reach Nome as we go to press. The War Department has been informed that it left Fairbanks, Alaska, for Nome on August 21, noon, and arrivel at Ruby the same day.

The War Department's telegram said that the planes arrived at Ruby in perfect order, flying in formation. All the aviators were well and their planes were in good condition. In that sparsely settled country hundreds of visitors came many miles to welcome the pioneer airmen. A dinner was given the members of the expedition by the pioneer settlers of Ruby.

Panama-Washington Flight Scheduled for Next Month

Washington.—Officials of the Army Air Service are confident that Lieut. Chas. B. Austin, who has been given permission to attempt a flight from France Field, Panama Canal Zone, to Bolling Field, Washington, will be successful in covering the 2,439 miles on the schedule set.

Lieut. Austin, who will fly alone in a rebuilt and improved De Haviland 4, is now supervising alterations to increase the gasoline capacity of his machine to make the long hops over the Caribbean Sea from the Canal Zone to Jamaica, a distance of 600 miles, and from Jamaica to Havana, 450 miles. The third leg, Havana to Arcadia, Fla., over water and land, is 250 miles.

Lieut. Austin hopes to get away early next month, before the hurricane season.

Record 20,900 Feet Parachute Drop

Arcadia, Fla.—Lieut. Arthur G. Hamilton of the army dropped 20,900 feet by parachute recently at Carlstrom Field, landing safely and establishing what officers said was a new world's record.

He carried two parachutes when he jumped from the aeroplane, the second being released as he neared the ground to slow up for the landing.

Variable Pitch Propellers for Training Planes

The War Department has detailed on temporary duty at March Field, Riverside, California, Seth Hart and R. I. Eustis in connection with the installation of the new adjustable pitch propeller on several of our Curtiss-Hispano training planes. One of the propellers is already on the field and will be installed as soon as a few minor changes can be made in the radiators. It is proposed to equip all training planes with this new propeller.

Mr. Hart is handling the manufacture and business end of the proposition for Eustis who is the original designer of the propeller. It is already past the experiment stage and has proven successful. Several of them are in daily use at McCook Field, Dayton, Ohio, from which point Mr. Hart has just returned. Several others are now being made for the navy department. Foreign nations have also bid for quantity production of this new propeller and are eager to utilize it on both British and French planes.

Mr. Hart will supervise the installation of at least five propellers of the adjustable pitch type. Future installation will then fall upon the staff of the Engineering Department.

A few comparative statistics will be of interest. By experiment it was found that an Hispano could gain 16,000 feet altitude or 73 aerial miles with a fixed pitch propeller in 52 minutes. The same motor with an adjustable pitch propeller made 20,000 feet or 88 aerial miles in 50 minutes.

On the take off with a fixed pitch propeller it required 200 feet and 13 seconds to take the ship off the ground. With the adjustable pitch propeller the plane hopped off within 75 feet in 5.4 seconds. In 14 landings with the pitch reversed the average roll was 80 feet. With the fixed pitch the average roll was in excess of 400 feet.

Men of March Feld will be interested in the experiments and operation of the new propeller in this atmosphere where even better comparative results are anticipated.

R-38 for U. S. Navy 60 Per Cent. Complete

Latest reports received at the Navy Department are that the dirigible R-38, now being constructed for the American Navy by the Royal Airship Works, at Bedford, England, is more than 60 per cent completed and probably will be ready to take the air by the latter part of November.

When the great dirigible, which will surpass in size any airship ever constructed, thrusts her nose out of the hangar at Bedford for the first time there will be a trained American crew aboard to put her through her trial flight. Several training cruises on the British dirigible R-33, offered by the British government for that purpose, already have been made by American naval personnel who will form the R-38's crew, and the mammoth airship will be manned by experienced sailors of the air when she sets out on her transatlantic flight, which, officials say, will be made next April or May.

With a gas volume of 2,724,000 cubic feet, the R-38 will surpass in size the largest rigid airship yet turned out by the Zeppelin company, the L-17, by 304,000 cubic feet, and the British dirigible, R-34, which crossed the Atlantic last year, by 711,000 cubic feet. Her six engines will develop 1,950 horsepower, or 130 more than the most powerful Zeppelin craft, and drive the great gas bag at an estimated maximum speed of seventy-five miles an hour.

To accommodate the 694-foot stretch of the R-38, the naval airship hangar at Cape May, N. J., already had been lengthened to 700 feet, and also increased in height. The two largest hangars now under construction at Lakehurst, N. J., probably will not be completed until July, 1921, or after the R-38's arrival.

Flying Status of Air Service Officers

The War Department on August 10th announced the adoption of a new policy in connection with the flying status of both flying and non-flying Air Service officers, and of officers of other services who have been detailed or attached to the Air Service for flight duty and otherwise.

The act of June 4, 1920, Section 13a, provides that flying units shall in all cases be commanded by flying officers. Only those officers who shall have been announced in orders as having qualified as aeroplane pilot, aeroplane observer, airship pilot, or balloon observer shall be considered flying officers within the meaning of said act. All other officers shall be considered non-flying officers. (a) All officers who on June 4, 1920, held the rating of military aviator, junior military aviator, or reserve military aviator shall be considered as having qualified as aeroplane pilots and shall be announced in orders as having so qualified. All officers who on June 4, 1920, held the rating of military aeronaut, or balloon observer, shall be considered as having qualified as balloon observers, and shall be announced in orders as having so qualified. All officers who on June 4, 1920, held the rating of observer or airship pilot shall be requalified in the above manner as aeroplane observer or airship pilot, as the case may be.

For flights in heavier-than-air craft, an officer is construed to have actually participated in regular and frequent flights during any period in which he has participated in aerial flights at the rate of ten flights per month. Officers holding a rating as pilot will be required to pilot an aeroplane during these specified flights, except when incapacitated for the performance of duty as pilot. For flights in lighter-than-air craft, a minimum of four flights or a total duration of at least four hours in either a free balloon, an observation balloon, or an airship, or four flights of at least four hours in any combination of the three, is construed as the time necessary to the status of having participated in regular and frequent flights for each month.

In order that a proper limit may be established in connection with the regularity of flights, it is construed that an officer may properly certify to his participation in regular and frequent aerial flights in any two succeeding months, if he participates in twice the number of flights indicated above, as the rate required per month. This construction will be made only where inclemency of weather or other unavoidable cause prevents an officer from making the required number of flights in one month. Whenever an officer is prevented from flying for a portion of a month, due to leave of absence, or other causes, which by regulation has been held to remove an officer from flying status, he is only entitled to flying pay for the balance of the month, after the completion of a sufficient number of flights at the rate above indicated.

FOREIGN NEWS

Aerial Line Across Europe

Stockholm.—International aerial traffic between the Scandinavian countries and central Europe was inaugurated recently, the first plane leaving Malmo, Sweden, for Berlin. The demand for passenger accommodation already exceeds the supply and an extra supply of machines has been ordered from Berlin.

The first postal aeroplane from Germany also arrived recently and the same machine carried back Swedish mail for Germany on the following day.

Under a new arrangement, passengers are able to fly from Malmo to the German frontier for an average price of 250 kroner ($67) each and then proceed to Berlin for 950 marks (normally $237.50). It is expected that six German machines, each capable of carrying 100 pounds of mail and two passengers, will operate the Scandinavian lines.

French Devise Aerial Torpedoes Guided by Shepherd Plane

Paris.—Flying torpedoes, directed by Hertzian waves, would be used if a new war broke out tomorrow, says an aviation expert in the *Petit Journal* of Paris. The writer declares that the latest experiments of the French Aviation Service have proved that five or six small and inexpensive bomb planes, without a pilot or mechanician, can be successfully guided by a shepherd in a larger plane through the means of Hertzian waves.

In view of the present achievement of having a flock of little planes under perfect control, the writer prophesies that within a year or two it will be possible to direct accurately the former from a land base to a distance of 100 miles or more.

Aeroplane Takes Pony to Play in Polo Game

London.—Being short a polo pony needed recently for a game to be started in the afternoon, Sir Philip Sessoon telegraphed to London to send a pony by aeroplane. The animal was delivered in time to be used.

The game was played at Sir Phillip's estate at Lympne.

Parisians Hail With Joy Arrival of a Zeppelin

Paris.—The long expressed desire of Parisians to see a Zeppelin under peaceful conditions has been gratified. Signalled, not by the noisy, screechy sirens which in war time drove every one into cellars, but by a brief, formal official announcement that L-72, a great German airship handed over to France in accordance with the peace treaty brought forth as loud cheers from Parisians as similar machines did sneers only two years ago. Long before the expected hour of visitation Parisians climbed to the uppermost heights of the city to witness the arrival and graceful evolutions of their former enemy.

Scores of peaceful aeroplanes showed thousands of eyes how they used to give chase to the German monsters. This time, however, they circled, looped, swept above and under the Zeppelin and proudly accompanied it, on the flight over the crowded streets of the French capital.

German Aviators Act as Spies for Bolsheviki

Paris.—A German aerial service has been organized, according to advices to the French Foreign Office, to supply the Russian Soviet staffs with all military information concerning Polish strategic movements that German pilots can perceive in their flights from East Prussia over Polish territory. The entire arrangement was outlined in a document which fell into the hands of the Polish authorities.

The Russian forces also are being supplied with enormous amounts of munitions and food across the East Prussian frontier, according to reports from the French military mission in Warsaw.

Aeroplane Carries Grouse to London from Highlands

London.—Shooting on the moors began on the historic "Twelfth" and grouse made their appearance in London the very day shooting started for the first time—that is, lawfully—in the long history of grouse shooting. Boxes of grouse sent by special aeroplane from the Highlands and lake district arrived in London in time for dinner to those few favored, or unfavored, ones who had not been able to join the exodus north.

New French Air Port

For eighteen months workmen have been preparing a new port at Orly, south of Paris. The existing port at Le Bourget is at present crowded; besides, it does not possess hangars for dirigibles. At Orly there will be hangars for dirigibles and also for airships of the Zeppelin type.

Aeroplanes Convey Food

It is officially stated that in Mesopotamia disorder on the Lower Euphrates continues and has assumed considerable proportions. The attacks by the tribes on the Basra-Baghdad railway and telegraphs have continued following the outbreak at Rumaïdha (in the Lower Euphrates Valley, about 250 miles from Basra), and the isolation of the Indian garrison there.

The garrison is being porrvisioned by aeroplanes and has also got supplies by means of raids into the town, which is held by the tribesmen. British aeroplanes have been active in bombing and machine-gunning hostile villages and tribal concentrations.

A French Aviatrix's High Flight

Although the Aero Club of France does not recognize women's records, as such, Mlle. A. Boland recently during a flight of 2½ hours on her Caudron G3, succeeded in reaching an altitude of 4,800 metres. It is understood that the flight was observed by the Commissioner of the Aero Club of France.

King Albert's Aeroplane

The aeroplane presented by the Handley Page Co. to King Albert of Belgium some time ago, and which has been re-fitted to King Albert's requirements, was flown from the Handley Page Aerodrome, Cricklewood, to Brussels, under the charge of Maj. Foote. The machine, a two-seater Bristol fighter, has been tastefully upholstered and fitted with an automatic folding desk, in addition to a set of drawers roomy enough to carry the King's personal travelling effects. The exterior has been finished in the best style of the coachmaker's art, with the Belgian Crown and the initial "A" emblazoned on the side of the machine. A Rolls-Royce Falcon engine is fitted, and the aeroplane has been tested up to a speed of 122 miles per hour at an altitude of 5,000 feet.

Opening of British Aircraft Competitions

THE British Air Ministry announces: The Air Ministry Competitions to ascertain the best types of aeroplanes which will be safe, comfortable and economical for air travel started at Martlesham Heath Aerodrome on August 3d. The land tests for seaplanes (amphibians) will commence at the same station on September 1st. Prizes to the amount of £64,000 are offered by the Air Ministry.

The Aeroplane Competition is divided into two classes:

Small type with seating accommodation up to six persons, excluding crew.

Large type with seating accommodation for seven persons or more, excluding crew.

The passenger requirements of amphibians are a minimum of two persons exclusive of the crew.

The final list of entries in each class is:

Small Aeroplanes:

Austin Motor Company Limited, William Beardmore & Co. Ltd., Bristol Aeroplane Company Ltd., Petters Limited (Westland Aircraft Works), A. V. Roe Ltd., Sopwith Aviation and Engineering Company.

Large Aeroplanes:

The Central Aircraft Company, Handley Page Limited, Vickers Limited.

Seaplanes (Amphibians):

William Beardmore & Company Limited, Fairey Aviation Company Limited, S. E. Saunders Limited, Supermarine Aviation Works Ltd., Vickers Limited.

The Judges Committee is constituted as follows:

Major General Sir F. H. Sykes, G. B. E., K. C. B., C. M. G., Air Commodore H. R. Brooke-Popham, C. B., C. M. G., D. S. O., Brig.-General R. K. Bagnall Wild, C. M. G., C. B. E., Wing Commander W. D. Beatty, C. B. E., A. F. C., Mr. C. B. Cockburn, Lieut.-Col. J. L. Travers, O. B. E., Lieut.-Colonel H. W. S. Outram, C. B. E., Squadron Leader V. S. Brown, Squadron Leader V. Sandford, Major P. Bishop, O. B. E., Squadron Leader T. O'B. Hubbard, M. C., A. F. C. (Secretary).

The machines in all classes are required to fulfill all conditions for a certificate of airworthiness. In the aeroplane competitions the tests are divided into 6 main groups, marks being given for speed, landing, getting off, reliability in flight, economy in operation, and general features.

To qualify in the high speed test each machine should attain a minimum speed of 100 miles an hour and for the slow speed tests machines should be capable of flying at a speed not exceeding 45 miles per hour.

In the landing and getting off tests each machine will be required to get off and land within a limit of 175 yards and 275 yards for small and large types respectively.

Machines will start to taxi 175 yards or 275 yards as the case may be from a fixed mark and will endeavor to fly over it as high as possible. Their height at the moment of passing over it will be judged photographically. For the landing tests the machines will land over a row of small balloons tethered 50 feet above the ground. These balloons will burst, if struck, but will not affect the machine in any way.

In the case of multi-engined machines, they will be required to land and take off with one engine cut out. For this test a row of small balloons will also be used and will be fixed to represent a hedge 6 ft. in height. Machines will be required to take off and land from a prearranged distance without damaging the balloons.

In the reliability and economy tests each machine will be required to carry out two consecutive flights of 3½ hours each. An Air speed of not less than 80 m.p.h. at a height of at least 3000 feet must be attained with a full load on board. Between the two flights the machines will be left untouched and a period of not more than 60 minutes will be allowed before the second flight, for the purpose of refuelling and examination. Among the other tests in this group is a self controlled flight in which the machines must be capable of flying at a cruising speed for a period of not less than 5 minutes. During this period the pilot is not allowed to use the controls but these may be locked.

In the case of multi-engined machines flights will also be carried out with one engine stopped.

In the amphibian competition the land tests will be more or less similar to those in the aeroplane class, but certain other trials will be carried out over the sea and taking off and landing will also be required on sea as well as on land.

Throughout the whole of the tests, the Judges Committee will examine and note the general features of each machine for the award of marks for the reliability of petrol and oil systems, ease of taxying, ease of starting engines and general behavior.

As many as the tests require calm conditions it is probable that most of the actual flying will take place in the early morning or late evening.

German Types Approved

From news received in France it appears that the Allied Commission of Control have permitted the following types of aeropalnes to be used for traffic: Junker, Fokker and Sablating limousines and the Sablating monoplane.

A Paris-Prague Air Service

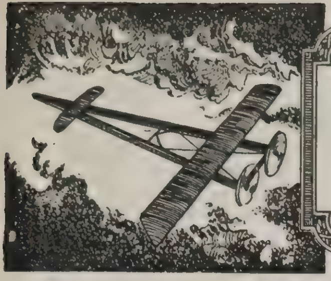
From a message received in Paris from Prague, it appears that a Franco-Roumanian company has secured ministerial approval of a contract for the inauguration of a regular air mail service between Paris, Prague and Warsaw, to commence in August.

Aerial Prospects in Mesopotamia

The British Air Force in Mesopotamia has always been a most useful asset. In a country of great distances where roads are bad owing to Turkish maladministration and often swamps after heavy rain, the sphere of action of troops is often restricted, but aeroplanes can act quickly and effectively.

There are already some 40 fairly good landing grounds, more than they possess in the Indian Empire. Mesopotamia holds out great possibilities for commercial aerial development also—no country in a greater degree. Even if the British had double the number of troops in the country they should not be able to administer it effectively, and make British rule synonymous with peace and prosperity to the people if they had not aeroplanes to help them.

Air Vice-Marshal Salmond arrived in Bagdad from India on May 10th, and made an extensive tour of Irak, Kurdistan, and all parts which come within the British sphere of influence, to enquire into local conditions. Several squadrons are to proceed to Mesopotamia forthwith.



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon

A Suggestion for Building an Aviette

Perhaps the reader has his own ideas as to the best way to build a successful aviette, but then a few suggestions may help one in completing his design.

I would suggest selecting at first an aviette that is propelled on the ground until sufficient speed is attained to get the machine in the air, rather than the one driven by a propeller after leaving the ground, as the latter is complicated for anyone other than a thoroughly experienced aviator mechanic.

The next step is to select the lightest bicycle that can be found. The racing type of bicycles are best suited to this purpose and many good makes are on the market. The weight of a light bicycle should be no more than 30 lbs.

The aviette used by Paulhan and others had only main planes with one plane greatly in advance of the other. To get off the ground the angle of incidence was increased which worked well, but I believe required much experimenting to get the proper balance.

I would suggest having a biplane setting, fastened to the rear of the bicycle at a point where the center of gravity would be located one-fifth back from the entering edge of the main planes. The center of pressure is generally located approximately one-third of the distance back, so when the center of gravity lays only one-fifth of the chord, there will be a tendency for the machine to "nose down." To offset this and to control the machine, an elevating plane should be located forward. The arrangement would be like the old Wright glider.

The reason I suggest the elevator in front rather than a tail plane, is this. In order to get the machine off the ground when a tail plane is used, it is necessary to depress the tail, which beside forcing the contraption to set on the hind wheel, would add a greater load, to the load being supported by the main planes. The elevator in front would not alone help the main planes by taking some of the load, but would answer quicker, take the machine off better, and besides is easier to hook up to a control bar or apparatus.

There is another good reason for the elevator in front, and that is, in case of a disastrous landing it would protect the remainder of the machine and pilot from injury.

Assuming that the bicycle weighs 30 lbs., the wings and elevator 60 lbs., and pilot 175 lbs., which gives a total of 265 lbs. to be carried.

I think the U. S. A. No. 4 curve (this was given in July 26, 1920, issue of AERIAL AGE) should be used and a biplane setting with no dihedral, nor stagger in the wings, a chord of 4 feet and a spread of 18 feet on top and 14 feet on lower wings. This would give 128 square feet which, when set at an angle of 16° and travelling at a ground speed of 20 miles per hour and a 5-mile breeze blowing against the machine, would sustain the load of 265 lbs. in the air.

A device must be thought out that will allow the wings to be set at a neutral angle while the operator is pedalling over the ground, or the machine would be lifted clear and the wheels would have no tractive power. I would suggest having the planes set on a boom extended from the cross bar in the bicycle frame and hinged so that they could be rocked from a neutral to a 16° angle. This could be done by having the handle bars movable and a cable or rod connected from them to the planes as well as to the front elevator.

When the operator feels that he has gained sufficient speed he simply pulls back the handle bars and the elevator and planes change their angles of attack and the machine lifts off the ground.

A rudder can be operated by attaching a control to the handle bars as well, and when a right or left turn is to be made they are turned right and left the same as when steering on the ground.

The main planes should be constructed of wood throughout with a light unbleached muslin or aeroplane cloth for covering.

The main beams should be of spruce but if good spruce cannot be obtained fir can be substituted. Fir can be purchased in any local lumber yard with a good grain. Be sure it contains no "dry rot." The main beams need not be channeled out but can be solid. That is, the thickness should be about ¾" x 2½" and not lightened. It would be better to have the wings in one piece. In this case the two spars are spliced and glued with a reinforcement wrapping of ½" tape lapped one over the other. This would increase the strength of the planes materially and would help in setting up machine.

The ribs are made of spruce or fir. The webs are lightened and should be 3/16" thick. The battens or flanges ½" x (⅛" to 3/16"). They should be spaced 16 inches apart. The entering and trailing edges are ¼" x ¾" with the outside edges rounded.

When covering the fabric should be laid out and sewed all around with one of the ends open, much the same as a salt bag. This bag or envelope is then pulled over the wing and pulled taut end to end to eliminate all wrinkles, then sewed. Then doped (three coats) to fill the pores and shrink the fabric. To save weight it need not be varnished.

The bracing wires can be hard piano wire and light turnbuckles or turnbuckles made from a strip of metal and a bicycle spoke. Cross bracing in the planes extends from center struts to outer struts, and for additional strength from rear wheel axle out to outer strut fittings underneath wing.

The elevator is built up like main planes. The ribs, of course, are smaller and instead of a wing profile, are built to a streamline shape. The elevator should be 8 feet spread with a 2-foot chord. The thickest section being 1½ inches at a point 8 inches from the entering edge. The rudder construction is the same as for the elevator in every respect.

Fittings for struts, wing fastenings, control terminals, etc., should be made of .050" or 18-gauge sheet steel, and if sheet steel cannot be obtained, sheet iron 16 gauge can be substituted.

It will require a little practice and experience before the correct setting of the wings is determined so I would advise the builder not to fasten them on permanently until a few trials have been made and the machine lifts off and glides evenly. The secret is to have the control so arranged, that as soon as the speed of the vehicle is great enough, the wings can be altered from zero to its greatest lifting angle, quickly, to take the machine off the ground and keep it there until the speed diminishes.

It is necessary to have the elevator set at a slightly greater angle than the main planes at all times when in the air, so in order to do this an arrangement much the same as that used in steering an automobile can be used.

The inside front wheel of an automobile, in making a turn, is at a greater angle to the car body than the outer. The reason for this is because it is running in a smaller circle than the outer wheel and therefore must be turned sharper. This is accomplished by having bowed arms extending from the spindle of the axle inwardly to which a tie rod is connected, which keeps the arm ends the same distance apart at all times, but when the wheels are turned the arm on the outside wheel is at right angles to the front axle, while the arm on the inside wheel is almost in line with the axle.

To do the same thing on the aviette it is only necessary to have the control horns on the planes and elevator tilted toward each other and tied with a tie rod of light weight such as a bamboo pole or aluminum tubing.

Many readers have requested information regarding aviettes and others have sent in photos of their ideas, so I would not be surprised to hear of some one breaking the record made by the Frenchman or flying for some length of time with nothing other than foot power and the help of favoring wind currents.

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

The Etheric Feminine

The Aviatrix, flying by,
Across the blushing sunset sky,
Loops the loop and flirts with Fate,
Then wonders if her heart's on straight!

—*Helen Fitzgerald Sanders.*

Matter of Education

Willie X. Aviator: Papa, what is the difference between a cootie and an ordinary bug.

X. Aviator: A cootie, my son, is one who has had military training, while a bug is merely a Home Guard.

Consolation

The big rookie, scared nearly out of his wits, had gone to the hospital for some trifling ailment, and was driving the orderly mad by a battery of nervous questions.

"What's that for?" he finally asked, pointing to the letters M. D., U. S. A., on his blanket.

"Oh, that?" said the orderly carelessly. "That don't mean nothing much. It just means, 'Many die, you shall also.'"

New York's First Hydroplane Station, Foot of 82d Street, N. R.

Sketched from such life as was in evidence by Herb Roth former bosun's mate, U. S. N

Sketched by Herb Roth in the "World."

Tale of Three Balloons

Three balloons sailed away one day,
  In a race through the air above;
They bumped the ground, to the dismay
  Of the crew, who were about to get out and shove.

From one they heaved all the ballast out,
  In frantic efforts to depart;
In a rain of sand we could not doubt
  The science of this aerial art.

Huddled together like freezing frogs,
  They drifted along to the south—
They jostled and jolted each other like logs
  On a mad stream toward the river's mouth.

Thus the balloons did quite resemble
  In their great attachment for eath other,
A scene where looney lovers assemble,
  To pine and feast their eyes on the other.

But the wind was bound to play the deuce
  With their affectionate embrace.
Wild gusts broke the party loose—
  Each on his own jocund goose-chase.

The trio, relieved of all restraint,
  Tore loose like wild aerial fauna;
One sphere proceeded thence to paint
  The town of old Tijuana.

A great din was heard within the walls
  Of this oasis—this modern Mecca.
The crew above could see the halls
  Where sang many a dark Rebecca.

The splash of savage spirits was seen
  In the Mexican temples of Bacchus,
Where gold vied with currency green—
  The land of cocktails and cactus.

The rumble of revelry was heard
  Like thunder in the clouds above,
And in that sousy-sensuousness many a word
  Sounded other than a token of love.

In the meantime the winds had conspired
  To drop the three heavenly infringers,
And our adventuresome sphere thus expired
  On the border with thirsty passengers.

Another sky-rider had landed
  To adorn a mere cabbage field.
It was no fault of the crew's they'd stranded
  Amid a bumperous sauer-kraut yield.

Yet another gay goose is a-galloping
  Betwixt the earth and the skies,
Where the wild winds are singing
  Of these aerial argosies.

"All that goes up must come down,"
  So reads an inscrutable law.
Thus, this balloon, like a clown,
  Plays a game of skyey see-saw.

Not content with dousing the crew,
  It bumps them across the land;
With glee, it alternately hopped and flew
  Across the sands of the Silver Strand.

Into the marsh with the bulrushes
  It "taxies" with unwonted ease;
And half of the swamp into the basket gushes,
  Round half a dozen immaculate knees.

By the shades of Pharaoh's daughters,
  The scene was as dismal and damp
As crocodile haunts in Nile's old waters
  Appear 'neath the dim Egyptian lamp.

About a mile from solid shore
  This sky-boat came to a slimy stop.
A C. P. O. swore he'd wade no more,
  And heroically made the riggin's top.

"Any port in a storm," he cries,
  As he shakes the muck from his feet,
Into those unlucky upturned eyes,
  Resigned to their fate beneath.

So here endth what might be an endless lay—
  The Tale of the Three Balloons—
One in a cabbage field, one in the bay,
  And a third in sight of the Mexican moons.

—*By Al.,* North Island Naval Air Current

The Solution of the Greatest Problem in Aviation

The
Martin Aerodynamic Stabilizer

Safety for your Aeroplane and freedom from Wright patent infringement

The Martin Aerodynamic Stabilizer is not an experiment, but has been submitted in actual flight to the severest tests.

It is built entirely of Aerometal, a light, strong, noncorrosible metal; is simple, having but three movable parts, and cannot get out of order.

It weighs less, and creates less head resistance than the standard controls it replaces.

It relieves operator of all concern for the lateral balance of the aeroplane, and takes its own definite bank on turns.

The only way an aeroplane equipped with Martin Aerodynamic Stabilizers can be made to roll is by operator steering alternately from one side to the other.

The structural and operative features embodied in the Martin Aerodynamic Stabilizer have been defined by the United States Courts as those which do not infringe the Wright Patent.

The device is fully protected by patents pending in all countries, and license is furnished with each installation.

In November, 1916, an American Army Aeroplane equipped solely with this device made the first flight in the history of aviation, without the operator having available either warping or other lateral control.

The flights embraced spirals, dives, figures of eight, landings with and across the wind, and a cross-country flight of 150 miles with passenger.

NOTE—The Aerodynamic Stabilizer is the invention of Capt. Jas. V. Martin, the American Master Mariner and pioneer Aviator, who originated, built and demonstrated the first successful Tractor Biplane in America.

THE MARTIN AERODYNAMIC STABILIZER

Address: Room 612, 280 Madison Avenue, New York

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RECENT CROSS-COUNTRY PERFORMANCES

J. Dixon Davis in three-passenger model
New York to Helena, Arkansas, 14 hrs. 40 min., flying time

Wilbur Larrabee in two-passenger model
New York to Minneapolis, Minn., 16 1-2 hrs., flying time

Capt. W. Beaver in three-passenger model
New York to Barbourville, Ky., 14 hrs., flying time

$3000 F. O. B. N. Y.

ALSO A FEW SOPWITH CAMELS

INTERALLIED AIRCRAFT CORPORATION, 185 Madison Ave., NEW YORK

(*Continued from page* 842)

Federation Aeronautique Internationale the true state of affairs aeronautical in the United States.

Will you not therefore send a message to Paris at your earliest convenience setting forth in strong terms your recommendation for action at this meeting of January 6th, and send the Club a copy of same?

Yours sincerely,
AMERICAN FLYING CLUB,
Lawrence L. T. Driggs.

Aero Club of America's Broadminded Comments on Flying Club's Insidious Work

January 9th, 1920.

Lieut.-Colonel W. G. Barker, V. C.
President, Aero Club of America,
34 Yonge Street, Toronto, Canada.

My dear Colonel Barker:

We greatly appreciate your courtesy in sending us a copy of the letters you received from the American Flying Club and your answers thereof.

As you request a statement from us, we will point out that the letters from the Flying Club are full of misstatements, some of which we shall quote herewith:

(1) Regarding the statement that the International Aeronautic Federation at a meeting on January 6th was to consider a protest from Mr. Bishop, the representative of the Flying Club and request made by Mr. L. L. T. Driggs, president of the Flying Club, to you and others to cable to the Federation, requesting that the Flying Club application for admission in the Federation, be considered. It is evident that this request was not made in good faith because the January 6th meeting of the International Aeronautic Federation was only a committee meeting for the purpose of considering the rules and regulations of the International contest to be held this year and for the First Aerial Derby Around the World . No new business could come up before it. Mr. Bishop was known to be acquainted with this fact and it was understood that that was the reason why he did not stay in France to wait for the meeting. If anybody did send cables to the Federation, as requested by the Flying Club, they wasted their good money.

(2) The Aero Club of America became part of the International Aeronautic Federation in 1905 and has won more international aeroplane and balloon races than any other single country represented in the Federation. Its standing is of the highest, as is shown by the communications from the Federation itself and the national clubs of the countries affiliated with the Federation. Also by the fact that the Club is one of the "big four" representatives of the Federation who, on account of their extensive activities have four votes in the Federation, whereas the rest only have two votes and one vote respectively. The Aero Club of America also has close to forty clubs affiliated with it.

(3) The Flying Club was not known by the Federation until the records of the New York-Toronto race were submitted to it, showing that the Flying Club was advised that it would be necessary to secure a sanction from the Aero Club of America and the Aero Club of Canada, as provided by the rules of the Federation and as it failed to do so the Federation disqualified the Flying Club, the period of disqualification being left to the discretion of the Aero Club of America.

(4) The insinuation that the Aero Club of America's membership is not largely made up of Army and Navy aviators shows lack of knowledge of the Club's membership. The annual report shows that the Club has 1831 Army and Navy Aviation officers in its membership and that over six thousand Army and Navy pilots have taken out the Club's pilot certificate during the past two years.

(5) Without wishing to cast any reflections on the Flying Club which is no doubt doing its best, and to which the officers of the Club wish it success, it must be pointed out that the Aero Club of America has probably a record over fifty times greater in activities for the past twelve months.

(6) Regarding the Trans-Atlantic Flight, the Aero Club of America worked for years to develop the plans for same and was repeatedly thanked officially for its pioneer work in that respect and when the flight was finally made and the naval aviators returned to the United States the Navy Department arranged to have the Club's reception Committee meet the ship which carried the aviators at Quarantine and subsequently entertained the aviators and presented the Club's gold medals to the four commanders.

The Aero Club of America was glad to see the Flying Club also entertain the aviators, as it was felt that the aviators deserved all the expressions of appreciation that could be given them.

(7) As the Aero Club of America took the initiative and arranged with the British Government for sending over the R-34, and has been honored by the British Government with presents of instruments and parts of the R-34, which it holds

as souvenirs, the Club also appreciated the courtesy of the Flying Club in entertaining the crew of the R-34 when they were there.

(8) The Aero Club of America was also asked to assist in the Trans-Continental race and raised prizes amounting to $68,000 for same. But it was found that the Army regulations forbid officers from taking prizes, and, at the request of Major General Charles T. Menoher, they were withdrawn. The Club was at that time sending three commissions to study the aeronautic interest and demand for aircraft in the United States, Europe and Japan and China and could not undertake to assist the Army as extensively as it would have done otherwise but the Army was assisted by the Clubs affiliated with the Aero Club of America throughout the country and General Menoher has just submitted to the Club the names of the winner of the Derby to be inscribed on the Trophy presented through the Club by Clarence H. Mackay for military competition.

(9) As to the statement that the Flying Club will homologate records, whoever issued such a statement is very much mistaken. Only the records homologated by the Aero Club of America, which is the sole representative of the Federation in the United States, will be recognized by the Federation and the countries affiliated with the Federation; and aviators participating in any unsanctioned event will be disqualified; as provided by the rules of the International Aeronautic Federation.

The statement that Clubs affiliated with the Aero Club of America are becoming affiliated with the Flying Club is untrue. As a matter of fact, the competition for affiliation with the Aero Club of America is so keen that if any affiliated Club were to consider breaking their affiliation they would find their places immediately taken by another Club, which would represent their district thereafter.

(10) The Aero Club of America's policy is to work for the development of every branch of aeronautics and does not waste time in petty bickering or in factional fights. Only by adhering strictly to this policy has it been able to foster the development of aeronautics on such an extensive scale and to achieve as much as it has achieved.

(11) The statement that the Flying Club was organized by Air Service Officers returned from overseas is incorrect. The Club was first organized as the International Air Service Club by F. G. Diffin, Albert L. Haustetter, Robert H. Sexton, Charles W. Mix, John W. Cox (who is owner of the Club house). None of these persons are aviators. As to the motives behind their organizing this new Club, the records show that the first two were part of a group of men who were accused in writing by Government officials of alleged profiteering during the war and the Aero Club of America was requested by the Government to assist in the investigation which is still in effect.

When the men who are under investigation learned that the Club was assisting the Government in this respect they tried to get control of the Club. They presented what was supposed to be an opposition ticket, but prominent men whose names they used on their ticket repudiated them and advised the Club that their names were being used without authorities and against their wishes. It was decided, however, that it would be best to let them proceed with their scheme and let the members of our Club decide the matter at the election. They were badly beaten, receiving only thirty votes while the regular ticket received one thousand three hundred votes.

They organized the so-called "International Air Service Club," the name of which was subsequently changed to "American Flying Club"—and you are familiar with the rest.

We give you this information as your Club represents the Federation in Canada, so that you will be fully conversant with the ethical side of this situation.

Wishing you success we remain

Yours very sincerely,
THE AERO CLUB OF AMERICA,
(signed) AUGUSTUS POST, Secretary.

Governors of Aero Club Could Not Get Financial Statement Regarding Flying Club

EXHIBIT B

THE AERO CLUB OF AMERICA
297 Madison Avenue
New York City

July 24, 1920.

Dear Mr. Woodhouse:

I am trying hard to obtain a statement of the assets and liabilities of the Flying Club and one showing their income for the six months ending June 30th, also for the year ending June 30th together with their expenses for the same period but thus far have been unsuccessful. I do not find any such statement has been filed with the Board of Governors and the condition of the Club that we are asked to consolidate with and the obligations they are under are unknown.

I requested acting President Edwards to give me this information and he replies as follows:

Abstract from letter.

"July 23rd, 1920.

"I have your letter of the 21st requesting certain information. I am not in a position and I doubt very much if either your Board of Governors or the Committee on Cooperation had the right to ask the American Flying Club for a certified statement of the Club in detail for the six months ending June 30th or for gross expenses in detail for the same period; and in addition for the year ending June 30th.

"And further I doubt very much whether we have any authority to ask for a statement of their assets and liabilities, etc."

He makes no reply to my request for a copy of the Club's lease that I may know the obligations they are under.

If you are in a position to give me the information it will aid me materially in the further consideraion of this plan for amalgamation.

Very truly yours,
(Signed) CHARLES J. GLIDDEN,
Major Charles J. Glidden,
Member Board of Governors
Aero Club of America.

(*Continued from page* 841)

TABLE III (*Continued*)
U. S. A. 27
M.I.T., Mar. 3, 1920. Velocity—30 M.P.H. Model—18" x 3" Wood

CHARACTERISTICS				ORDINATES		
i	Ky	L/D	C.P.	Distance from L.E.	Lower Ordinate	Upper Ordinate
— 6	—.00047	—2.5	....	0.00	1.77	1.77
— 4	.00012	1.1	....	1.25	.50	3.80
— 2	.00062	8.0	56.5	2.50	.33	5.07
0	.00099	13.6	43.3	5.0	.17	6.93
2	.00140	16.1	38.3	7.5	.10	8.22
4	.00179	15.7	36.0	10.	0.00	9.17
6	.00213	14.6	34.7	15.	.10	10.50
8	.00251	13.4	34.0	20.	.35	11.33
10	.00284	12.0	33.3	30.	.95	11.90
12	.00319	10.8	33.0	40.	1.17	11.57
14	.00346	9.9	33.3	50.	.80	10.77
16	.00359	8.6	33.7	60.	.25	9.52
18	.00350	6.8	34.0	70.	.10	8.00
				77.	0.00	....
				80.	.05	6.03
				90.	.15	3.65
				100.	.67	.67

Radius L.E. = 1.06
Radius T.E. = .21

TABLE III (*Continued*)
U. S. A. T.S. 5
M.I.T., Feb., 1919. Velocity—30 M.P.H. Model—18" x 3".

CHARACTERISTICS				ORDINATES		
i	Ky	L/D	C.P.	Distance from L.E.	Lower Ordinate	Upper Ordinate
— 8	.00017	1.8	....	0.0	2.50	2.50
— 6	.00051	5.8	.91	2.5	— .80	5.69
— 4	.00088	9.6	.62	5.0	—1.80	7.50
— 2	.00126	11.8	.50	10.	—3.00	10.10
0	.00164	12.6	.44	15.	—3.40	12.00
2	.00200	12.8	.40	20.	—3.50	13.30
4	.00237	12.2	.38	30.	—2.90	14.60
6	.00271	11.3	.36	40.	—1.50	14.68
8	.00303	10.5	.355	50.	— .60	13.80
10	.00336	9.9	.35	60.	— .40	12.40
12	.00362	9.3	.34	70.	— .20	10.40
14	.00385	8.5	.33	80.	.00	7.76
16	.00379	7.3	.32	90.	.00	5.00
				100.	1.00	1.00

Radius L.E. = 3.00
Radius T.E. = 1.00

TABLE III (*Continued*)
R. A. F. 15
M.I.T., Dec. 30, 1918. Velocity—30 M.P.H. Model—18" x 3" Alum.

CHARACTERISTICS				ORDINATES		
i	Ky	L/D	C.P.	Distance from L.E.	Lower Ordinate	Upper Ordinate
— 2	—.00004	....	....	0.00	.27	.27
0	.00033	8.1	.443	1.25	— .47	1.86
2	.00085	16.6	.367	2.5	— .70	2.78
4	.00122	16.5	.327	5.0	— .93	3.95
6	.00160	15.4	.310	7.5	—1.00	4.62
8	.00194	13.4	.300	10.	—1.00	5.05
10	.00228	11.9	.297	15.	— .78	5.53
12	.00260	10.7	.290	20.	— .50	5.75
14	.00240	5.0	.350	30.	— .06	5.83
				40.	— .03	5.63
				50.	— .20	5.30
				60.	— .50	4.80
				70.	— .67	4.13
				80.	— .58	3.26
				90.	— .35	2.23
				95.	— .16	1.74
				100.	.42	.42

Radius L.E. = .45
Radius T.E. = .42

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"Uphold the Law, Foster Aeronautic Activities" Keynote of Meeting of the Aero Club of America

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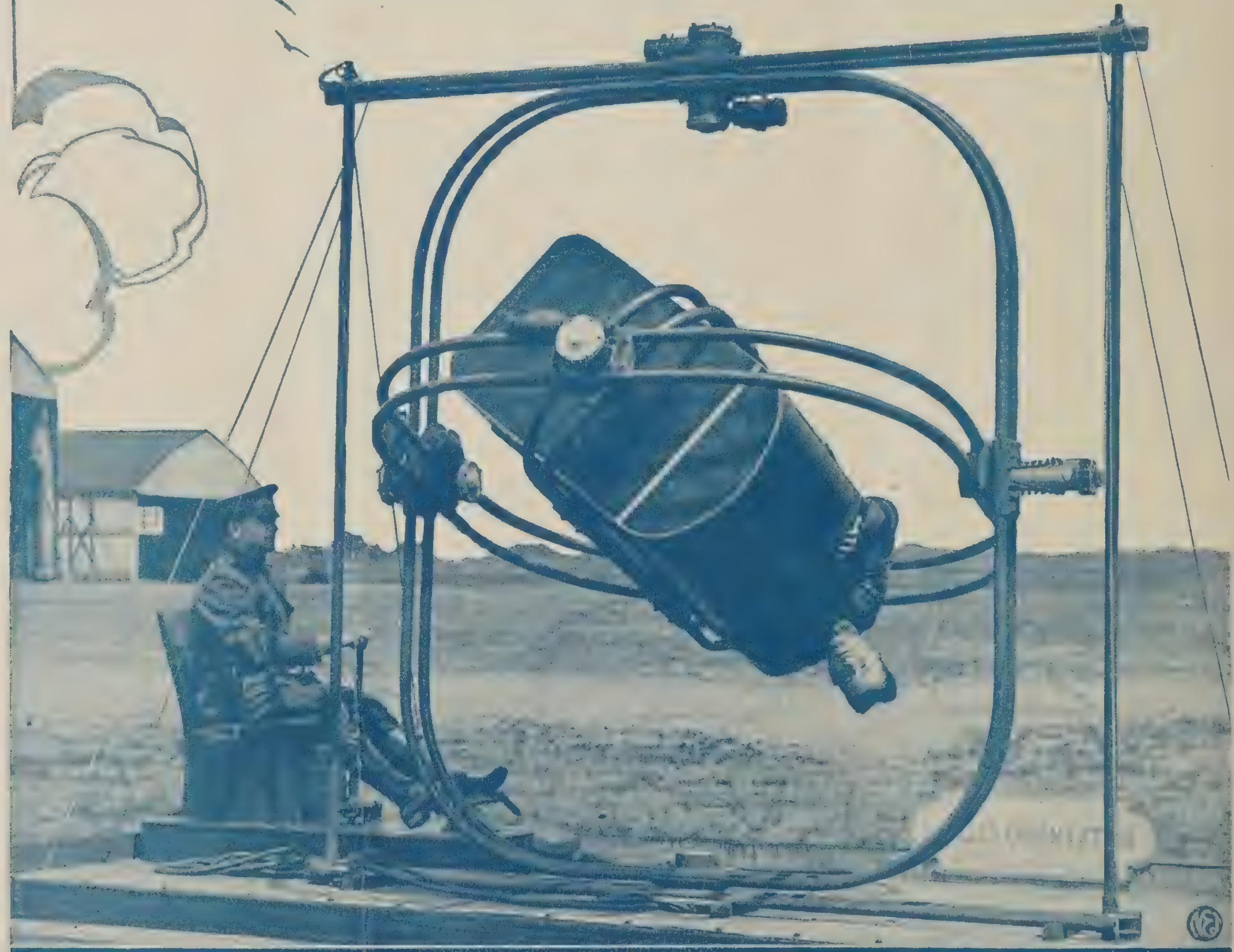

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VOL. XI SEPTEMBER 6, 1920 NO. 26

TABLE OF CONTENTS

PAGE
"Uphold the Law, Foster Aeronautic Activities" Keynote of Meeting of the Aero Club of America 863
The News of the Week 865
The S. E. J. Cox-Gordon Bennett Expedition 867
The Aircraft Trade Review 868
Edmond De Marcay Aeroplanes ... 869
Phenix Fireproof Dope 870
Naval and Military Aeronautics ... 875
Foreign News 876
Elementary Aeronautics and Model Notes 877
Aeronitis 878

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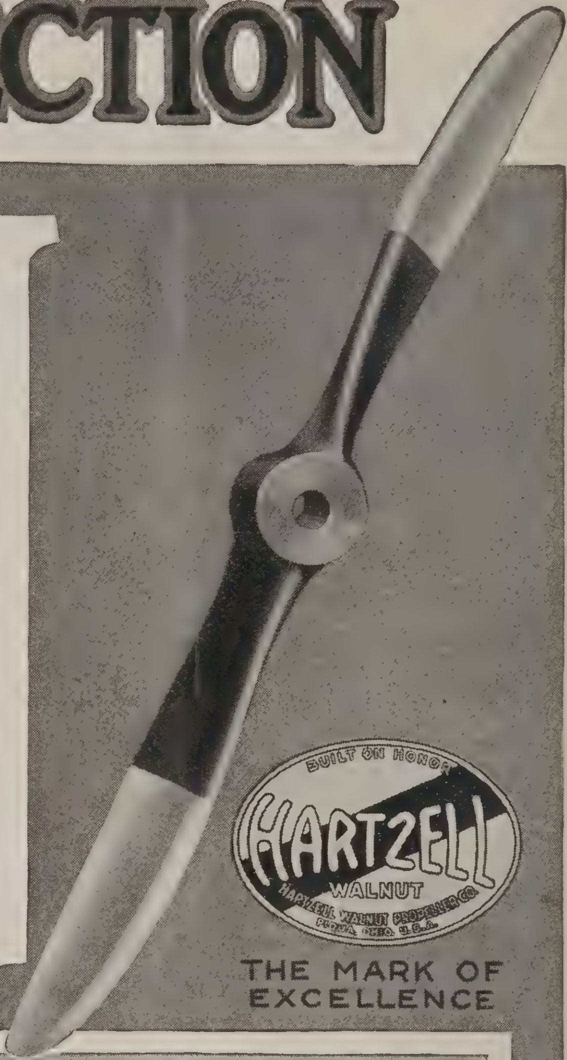

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"UPHOLD THE LAW, FOSTER AERONAUTIC ACTIVITIES" KEYNOTE OF MEETING OF THE AERO CLUB OF AMERICA

ONE does not win a game of chess by sweeping the other person's men off the chessboard, nor win a ball game by stealing the opponent's outfit. As a matter of fact *he would lose that game for having violated the rules of the game.* Of course, this lawless player, after sweeping the other person's men off the board or stealing the opposing team's outfit may announce that he has won the game. But that does not make him a winner. When the truth becomes known—and it usually does become known—he comes to grief because the case is then reviewed and the facts show that he violated the rules of the game.

Likewise, in other walks of life one only wins by honest, fair and square actions and by proceeding in accordance with the law.

The affairs of men are governed by unwritten and written laws. The first insure natural justice, the second compel legal justice. Wise people begin with regarding the unwritten laws, and govern their actions by the requirements of natural justice; and thereby they avoid the troubles and mortifications that come with being compelled to obey written laws and being forced to obey the mandates of legal justice.

The first brings the natural satisfaction and gratification which comes with the knowledge that one has acted honestly; the second usually brings grief, trouble and condemnation.

A review of the actions and statements of the few individuals who have assumed temporary control of the Aero Club of America by the devious, irregular and illegal ways stated in the evidence printed in the past six issues of AERIAL AGE, shows that they claim to have won a case when, as a matter of fact, they have just obtained temporary control of the club by violating the Membership Corporation Laws of the State of New York, the by-laws of the Aero Club of America and the written and unwritten laws which govern the affairs of membership corporations.

The individuals who have assumed temporary control of the affairs of the club by the misrepresentations and irregular and illegal actions stated in affidavits filed in the Supreme Court of New York, and printed in recent numbers of AERIAL AGE, continue to issue false statements. For instance, these individuals sent to the members of the club and caused the printing and circulating of statements to the effect that the Courts had dismissed the case against them. This statement is false. **The truth is that the case has not yet gone to trial.** There are two actions against these individuals and the fact that they were not dismissed on the preliminary motions and are now going to trial is in itself evidence that the Courts entertained and supported the actions—which will be prosecuted diligently and witnesses will be summoned and evidence will be produced to support the charges made in instituting the actions.

Here are a few striking facts that show how carelessly these individuals have been and still are in disregarding the law and handling truth. In a recent statement issued by them we read the following:

> *"The new Board of Governors were directed to assume the lease and enter into the use of the club house of the American Flying Club at No.* 11 *East Thirty-eighth St., New York, which will hereafter become the permanent home of the Aero Club of America."*

The evidence shows that this "new board" was created because under the Membership Corporation Laws of the State of New York it is necessary to have the approval of the majority of the entire Board of Directors to sign a lease such as the Flying Club lease, but these schemers had been unable to obtain the approval of the majority of the Board. Therefore, they hit upon the scheme of getting twenty-five members to sign the call for a special meeting, to consider a proposed change of one section of the Constitution of the club, and then by a series of misrepresentations they made it appear that said meeting had authority to vote to amalgamate with the Flying Club and abolish the present Board of Directors of the club, and by this scheme claimed authority to make the Aero Club of America assume the obligations of the Flying Club and the operation of the Flying Club, which caused a deficit of over $50,000 to that club during the past year.

But Section 7 of the Membership Corporation Law of the State of New York provides that consolidations can only be effected as follows:

> **"Any two or more membership corporations, incorporated under or by general or special laws for kindred purposes, being purposes for which a corporation may be formed under any article of this chapter, may enter into an agreement for the consolidation of such corporations setting forth the terms and conditions of consolidation, the name of the proposed corporation, the number of its directors, the time of the annual election and the name of the persons to be directors until the first annual meeting. Each corporation may petition the Supreme Court for an order consolidating the corporation, setting forth in such petition the agreement for consolidation, a statement of all its property and liabilities and the amount and sources of its annual income. Before the presentation of the petition to the Court, the agreement and petition must be approved by three-fourths of the votes lawfully cast at a meeting of each corporation, separately and specially called for that purpose, which approval, duly verified by the Chairman and Clerk of such meeting, shall be annexed to the petition. On presentation of the petition, the certificate of approval and the agreement for consolidation, and on such notice to interested parties as the Court may prescribe, and after hearing such**

interested parties as desire to be heard, the Court may make an order for the consolidation of the corporation on such terms and conditions as it may prescribe."

At every meeting where the matter was discussed, since April 7th, 1920, members of the Board asked questions about the obligations and liabilities of the Flying Club and these schemers realized that they could never hope to secure the necessary approval, so they set out to deliberately conceal their schemes and attempt to carry them out in violation of the law.

They even went so far as to vote illegally obtained proxies to abolish the board of governors which had been duly elected at regular annual meetings of the Club by the entire membership of the Club. This they did in direct violation of the Membership Corporation Laws of the State of New York, which provide that in the event of a change in the board of directors, **"each director then in office shall serve until his term expires."**

However, they could not change the terms of office of the directors unless they first complied with Section 7 of the Law, which they did not do, therefore, the so-called "new board" is illegal, just as the abolishing of the old board was illegal.

Therefore, the entire transaction is illegal and the signing of the lease for the Flying Club is illegal.

The above are only a few of the irregularities perpetrated by these schemers during the absence of the majority of the Board of Governors of the Club and during the summer vacations.

These schemers counted on the fact that as a rule club members resign rather than to fight for their rights if anything goes wrong in the Club of which they are members. But they were mistaken in their calculations. The Aero Club of America is too important an institution, it has meant too much to the country to be permitted to fall into the hands of such schemers.

Notwithstanding the summer vacation, over one third of the membership has taken up the fight and legal actions have been instituted and other actions being instituted will be prosecuted diligently until the members of the Club have gained full knowledge of the facts and by the action of the entire membership these schemers are forced to give up the hold they have assumed on the Club and the Club is again restored as an independent moral force.

Special Meeting of August 28th

The special meeting of the members of the Aero Club of America called at the Club House, 297 Madison Avenue, New York, at ten a. m. on August 28th, was held by adjournment at the office of the Aerial League of America, at 280 Madison Avenue, as the furniture had been moved and the Club House closed by order of the few individuals who have assumed temporary control of the management of the Club.

Over one third of the membership of the Club was present in person or by proxy, including about one hundred of the leading and most influential members of the Club and one hundred air service officers.

The meeting was held in response to a call signed by five governors and thirty-five members and in accordance with the constitution and by-laws of the Club, which provides that special meetings may be called by five governors or twenty-five members. Notice of said meeting was presented to the Board of Governors on August 4th, then filed in the Supreme Court on August 7th, and then presented to the Secretary of the Club on August 14th, by Major Charles J. Glidden.

In the absence of the President or Vice-President, Major Charles J. Glidden, a member of the Board of Governors, presided and in the absence of the Secretary, Mr. G. Douglas Wardrop acted as Secretary of the meeting.

The chairman stated that the object of the meeting was fully set forth in the call of the meeting and the proxy sent to members which read as follows:

I, the undersigned, a member of the Aero Club of America, believing that in justice to the members of the Club, and to safeguard the Club's best interests, and in compliance with the Membership Corporation Laws of the State of New York, the members of the Aero Club should be given a fair opportunity to consider in detail and vote upon separately, by ballot, on the many changes proposed in the Constitution and By-laws of the Club and the proposed plan to assume the lease and operation of the American Flying Club, which is known to have caused a deficit of over $50,000 during the past year to that Club; and believing, further, that the proposed changes and extensive financial obligations which it is proposed to assume should be submitted to the entire membership with adequate explanation of the purposes of said proposed changes and projects and a detailed statement showing clearly how it is proposed to meet the new large financial obligations to be undertaken in connection with the proposed changes of quarters; and believing further, that during the vacation season, when a large percentage of the members are away, it is not possible to insure the serious and adequate consideration which should be given to this matter by the whole membership of the Club in less than sixty days from date of mailing the said information to members; and in view of the fact that the regular annual meeting of the Aero Club of America is to be held on November 8, 1920, and it would save time and efforts and the cost of extra printing and postage to have these vital questions submitted to the members in connection with the notices of the annual meeting; hereby constitute and appoint Charles J. Glidden, Captain Robert A. Bartlett and Brigadier General Robert K. Evans, U. S. A., or either of them, my attorneys and proxies, in my name, place and stead, with power of substitution, to act for me and in my name and as my proxy at a Special Meeting of the Club to be held on the twenty-eighth day of August, 1920, or on such other day or days as the meeting may thereafter be held by adjournment or otherwise, hereby granting my said attorneys and proxies, or either of them, or their substitute or substitutes, full power and authority to act generally for me and in my name at the said meeting or meetings, and to vote thereat in my name, or otherwise, in the transaction of such business as may come before the meeting, as fully as I could do if personally present, and expressly to vote in favor of postponing all action on the proposed amending or rescinding of the present Constitution and By-laws and the adoption of a new Constitution and By-laws, and on the proposed plan to make the Aero Club assume the large financial obligations of leasing and operating the American Flying Club House, expressly ratifying and confirming all that my said attorneys and proxies, or either of them, or their substitute or substitutes, may do in the premises. And I hereby appoint my said attorneys and proxies, or their substitute or substitutes, as my agent to affix hereto such Revenue Stamp as may be required by law.

Uphold the Law Keynote of Meeting

"Uphold the Law," was the keynote of the meeting. Many letters received from members of the Club scored in a forceful manner the "high handed and illegal actions" of the few individuals who took advantage of the absence of fifteen governors of the Club and of the summer vacations and by misrepresentations and other illegal methods obtained proxies from members and by further actions which directly violate the Membership Corporation Law of the State of New York, assumed control of the management of the Aero Club of America.

The meeting pledged itself to assist the Government in the investigation of the two billion dollar aircraft scandals, the burning and destroying of surplus aircraft and material which cost millions of dollars and could have been salvaged; and abiding strictly to the law in the conduct of the Club's affairs, authorizing the instituting of legal proceedings whenever necessary to compel those individuals who have assumed temporary control of the Club to comply with the Membership Corporation Laws of the State of New York, and the by-laws of the Club as they existed prior to August 16, 1920.

The following resolutions were adopted at the meeting:

WHEREAS, eight governors of the Aero Club of America whose total activities for, and contributions to the welfare of the Club during the past eight years did not total one hundredth part of the activities and contributions of Mr. Henry Woodhouse, presumed to suspend Mr. Woodhouse as a member and Governor of the Club because Mr. Woodhouse very properly sought by legal proceedings to protect the legal, moral and financial rights and interests of the absent Governors and members of the Club, which action was made necessary by the refusal of said Governors to submit to all the Governors and to the membership of the Club statements showing the extent of the financial and moral obligations and liabilities to be incurred in connection with a proposed plan to make the Aero Club of America assume the financial obligations of the American Flying Club, which were known to have caused a deficit of over $50,000 to the said Flying Club during the past year; and,

WHEREAS, it is also evident that one of the objects sought in suspending Mr. Woodhouse was to prevent his casting a negative vote and very properly blocking the

(*Continued on page* 871)

THE NEWS OF THE WEEK

Cup Racer Flies 223 Miles An Hour at Trials

Atlantic City, N. J.—Mr. S. E. J. Cox, President of the General Oil Company of Texas, and millionaire sportsman, asserted here recently that his aeroplane the Texas Wildcat, one of his entries in the James Gordon Bennett Cup races in France, September 27, had at Mineola shattered the world's speed record of 162 miles an hour by attaining a speed of 223 miles an hour in a secret test flight.

It was intended keeping this record a strict secret until the time of the race but it was learned that foreign interests have learned of the achievement.

Roland Rohlfs and Clarence Coombs, record holding aviators, will pilot the Cox planes in the cup race. They have sailed with four planes and Mr. and Mrs. Cox and their son, Seymour, who became prominent as a youthful flyer when he flew from his home in Houston, Texas, to the Raymond Riordan School at Highland, N. Y., last Fall, will sail for France September 7.

Aero Club of Buffalo Holds Aerial Outing

A most successful and interesting outing took place at Hammondsport, N. Y., on Sunday, August 22, at the close of the first aerial "get together" meeting of the New York State aviators.

The first plane arrived at the Hammondsport Field just before noon on Friday, August 20, piloted by Leo Chase, manager of the Curtiss Exhibition Company of Buffalo, and Harold C. Kinne, secretary of the Aero Club of Buffalo. They were followed at short intervals by Lloyd W. Marshall, piloting a Standard plane, from North Rose, N. Y., Mr. E. J. Walsh as a passenger, and L. V. Miner with J. M. Marshall of Oriskany Falls in another Standard. Others attending arrived at Hammondsport Friday afternoon and the remainder Saturday.

A buffet luncheon was served for the aviators on Friday afternoon at the Glenwood Club of Hammondsport, and later about sixty aeronautical enthusiasts attended the dinner at Keuka Inn, under the auspices of the Aerial Service Corporation, the Airship Manufacturing Company, the Chamber of Commerce of Hammondsport, and the Aero Club of Buffalo. Senator Wadsworth was the principal speaker of the evening and gave an interesting talk, showing the relation between the important part now played by commercial flyers and the future defenses of the Government in the air.

On Saturday thousands of visitors arrived in Hammondsport to see the aerial exhibitions, races, etc., which were continued through the week-end.

Plan Berlin-San Francisco Airship Line

Akron, O.—Two of the largest aircraft ever built will soon be flying between this country and Germany, it was stated recently by John Gammeter, aeronautical expert of the B. F. Goodrich Rubber Company, who has just returned from a business trip abroad. According to Mr. Gammeter the ships are of the super-Zeppelin type and are now being built in Germany for American interests. They will be used in freight and passenger service between Berlin and San Francisco, via New York.

Next June they will make regular trips between Germany and this country and will make stops at Paris, New York and Chicago. The schedule time for the entire trip from Berlin to San Francisco will be less than four days. The airships will be capable of carrying loads of thirty tons, including the weight of freight and passengers, and will be fitted up luxuriously similar to a transatlantic liner.

The project is being financed by the Hamburg-American Steamship Line and a prominent American automobile manufacturer. According to present plans the passenger rates charged will not be much greater than first class rates on the steamship lines.

Inspects Timber Land by Aeroplane

Traveling 200 miles in 144 minutes, part of the time circling low to note the destruction done by forest fires in the Yakima district, Washington, Aviator R. L. Ehrlichman of the Cascade Lumber Company with the vice-president of the company, recently inspected the timber holdings of that company by aeroplane. Mr. Rand said upon returning, that the aeroplane is the only means of making trips for such a purpose and he intends to make other trips of inspection by plane in the near future.

Contract Given for Key West-Havana Aerial Mail

Postmaster General Burleson, on behalf of the Post Office Department, and Major Geoffrey Harper Bonnell, Vice-President of the Florida-West Indies Air Ways Company, Inc., have concluded a contract for carrying the mail by seaplane from Key West to Havana for a period of one year, beginning October 15, 1920.

Under the provisions of the contract the mail will be taken by seaplane from Key West immediately after the arrival of the forenoon train at Key West and will result in placing the American mail in the Havana post office in time for delivery, at least in the business district, that same afternoon, and thus enable the addressee to reply to the letter in time to have it dispatched by the returning seaplane which leaves Havana at 5 o'clock in the afternoon and connects with the 9 o'clock northbound mail at Key West.

Letters and other first-class mail up to four pounds, 6 ounces, and not exceeding 19 inches in length and girth combined, must be prepaid at the rate of 6 cents per ounce or fraction thereof. Letters with this aeroplane postage and marked "via seaplane" will be insured dispatch through the air from Key West to Havana. Mail arriving at Key West by train after the departure of the seaplane will be given the first steamboat dispatch out of Key West and will not be delayed until the plane departure the next day.

Train No. 86, leaving New York at 9:15 a. m. with the night's accumulation of mail from New England, New York and other points, and arriving at Key West at 10:50 a. m., the following day, is the mail train connection for the seaplane bound for Havana.

This is the first aerial mail contract made by the United States under the authority of the law which provides that the Postmaster General may contract to send foreign mail by seaplane.

The mail is to be carried in an F-5-L flying boat equipped to carry 12 passengers and also freight, and propelled by two Liberty motors.

Major Bonnell was in the Royal Flying Corps and later a major in the U. S. Air Service. He commanded a flying squadron in both armies at the front during the war.

Christen Giant Balloon U. S. No. 1

The new giant balloon constructed at Fort Omaha Balloon School was christened recently by Miss Mary L. Anstead, a Cleveland beauty, as the U. S. No. 1, at Omaha, Nebraska.

As there were sixteen society ladies anxious to do the sponsoring, a contest was held to decide which one would christen the balloon.

Each of the contestants' names were placed in a silken bag supported by six sounding balloons of sixty inches in diameter. At a given signal little Miss Jane Peters picked one by one the names, the winner's name being the last picked, and Miss Anstead being the lucky one.

At the christening all the contestants were on hand, in addition to Mr. A. Leo Stevens, Instructor and Chief Balloonist of Fort Omaha Balloon School, Colonel C. De F. Chandler, Chief of Balloon and

The Army's entry in the International Balloon Race was recently christened at Fort Omaha, Nebr. The sponsor was elected by ballot and Miss Mary Ansted, third figure from the left in the group, was the lucky person. Also in the group are Col. C. De F. Chandler, A. Leo Stevens, and Colonel Jacob Wuest

Airship Division, Washington, D. C., and Colonel Jacob Wuest, formerly commandant of the Fort Omaha Balloon School.

The U. S. No. 1 is the first Army Balloon built by the Government under its own roof. It stands one hundred and five feet in height when inflated.

The Fort Crook Infantry Band furnished the music for the affair and a very large crowd attended the celebration.

U. S. to Build 560 Foot Dirigible

Washington.—Plans have been perfected for a monster Zeppelin, bigger than any in the world except the R-38, which is being constructed in England for this country. The plans are in the hands of the Navy Department and the Zeppelin will cost about $1,750,000. It is to be 560 feet in length.

Fast Flight from Yakima to Tacoma, Wash.

Aviator Lawrence Brown of Yakima, Washington, recently flew from Yakima to Tacoma a distance of 120 miles over the Cascade mountains in one hour and seventeen minutes. The altimeter showed that he went up 15,000 feet when he crossed the mountain ranges.

Foreign Officers to Attend U. S. Air Service Schools

Washington.—Army officers representing seven South and Central American republics and Cuba will attend the United States aviation schools in which courses in flying open about October 1, the Army Air Service announced recently. Countries which have accepted the invitation of the Adjutant-General are Guatemala, Venezuela, Ecuador, Peru, Chile, Bolivia, Paraguay and Cuba.

Chile also has accepted an invitation to send two non-commissioned officers to the Air Service mechanics' school at Kelly Field, Texas.

To Open Aviation School in Spokane

Spokane, Washington.—An aeroplane school of instruction, one of the first to be established in the Northwest on an extensive scale, will be opened early in the fall in Spokane, by the Modern Automobile and Tractor company. Ralph Robinson is secretary of the company and the teaching staff will include Lieutenant N. B. Mamer, E. E. Tattersfield, and Samuel Ferber, experienced fliers and mechanics at the United States Aircraft Corporation operating east of Spokane. In the first shipment of equipment for the school were 36 different makes and models of aeroplane engines valued at $100,000. Similar schools by the same company will be conducted in San Francisco, Seattle, and St. Paul.

Seattle to Have Large Aviation Station

Seattle, Washington.—Unique in method of preparation is the clearing of the publicly owned Sandpoint aviation site which is to be Seattle's public landing field for both land and water planes. Work is to start immediately under contracts awarded by the county commissioners in clearing the site, which is now heavily timbered. The field will yield at least 20,000 cords of wood and will net a total profit of $165,000. The cost of clearing per acre is estimated at $172.80, to which must be added the expense of grading and leveling. It is expected that a mill will be set up to take care of the timber. The first step in the improvement will be the clearing of a strip 500 feet wide and one-half mile long under the direction of an aviation expert appointed by the War Department. A committee from Congress will visit Seattle in November to inspect the site with a view to making recommendations for its development from a military and navy standpoint.

Senator James W. Wadsworth who took a prominent part in the recent Aerial Carnival at Hammondsport. It was the occasion of the Senator's first flight

Pacific Aero Club Quarters Are Popular

The new club rooms of the Pacific Aero Club, which since May 1 has been quartered with the Union League Club, at 185 O'Farrell Street, San Francisco, have proved so popular that the organization now has a membership of 135, the largest in its history. Included among the members are flyers of the Western Department of the Army Service stationed at San Francisco.

In its club rooms the Pacific Aero Club maintains an exclusively aeronautical library, which contains every publication in the country devoted to aviation subjects. Reports and communications of other aeronautical organizations in the United States, Canada and Great Britain are kept on file.

An information bureau for the service of members and visiting aviators is also maintained. Questions regarding the aeroplane trade, flying conditions around San Francisco and aviation records are answered by this bureau.

Plan Dirigible Hangar at San Diego

Tentative plans for the construction of a large dirigible hangar at the naval aviation base on North Island, San Diego, Calif., was announced recently by Secretary Daniels. Although the Army, which also makes use of the island as an aviation base, has offered some objections to the project the Secretary said he believed these could be overcome through agreement of the joint aeronautical board.

U. S. Ace to Marry

Announcement has been made by Mr. and Mrs. William B. Dinsmore, of Tuxedo Park, N. Y., of the engagement of their daughter, Miss Marion Carey Dinsmore, to Francis May Simonds, Jr., son of Mr. and Mrs. Francis M. Simonds, of New York City. Mr. Simonds was graduated from Columbia in 1916, and during the war was in the Air Service, becoming an ace before the armistice was signed.

New York Paper Delivered to Alaska by Planes

Fairbanks, Alaska.,—Captain Street commanding the four army aeroplanes flying from New York to Alaska, delivered to *The News Miner,* the only newspaper published there, a copy of *The New York Times* of July 15, brought in forty-eight hours thirty-two minutes actual flying time from New York to the heart of the interior of Alaska.

On Aug. 17, aeroplanes 2 and 4 of the New York-Nome expedition arrived at Dawson, Yukon, bringing a copy of *The New York Times* of July 15 to Dawson, the first newspaper ever conveyed directly from the American metropolis to the Klondike's famous old gold fields and new silver fields, and marking an epoch in the circulation of a daily paper. The actual traveling time was 47 hours and 48 minutes.

Account of New York to Barbourville Flight

A very interesting account of the excellent flight from New York to Barbourville, Ky., recently made by Capt. W. Beaver, manager and chief pilot of the Barbourville Aero Company, and W. E. Mechanic, chief mechanic, in an Avro aeroplane powered with a 110-H.P. Le Rhone motor, is given in the following log:

Leaving Hazelhurst Field, Long Island, on the morning of August 9th, they flew cross country to Binghamton, N. Y., and landed at Endicott, seven miles west of Binghamton. After filling up with gas and oil, they proceeded to Hammondsport, stopping on the way at Athens, where they took up several passengers. They then continued to Hammondsport and landed on the field of the Aerial Service Corporation, where excellent service was received. The flyers remained here over night, and the next morning left for Westfield, N. Y., but landed at Howell first, where they took some more passengers. After filling up with fuel they proceeded to Westfield and, after running into two terrific storms, were forced to land on a small field at Olean. After the storm had passed over the flight to Westfield was again continued and they landed on a good field about a mile from the town.

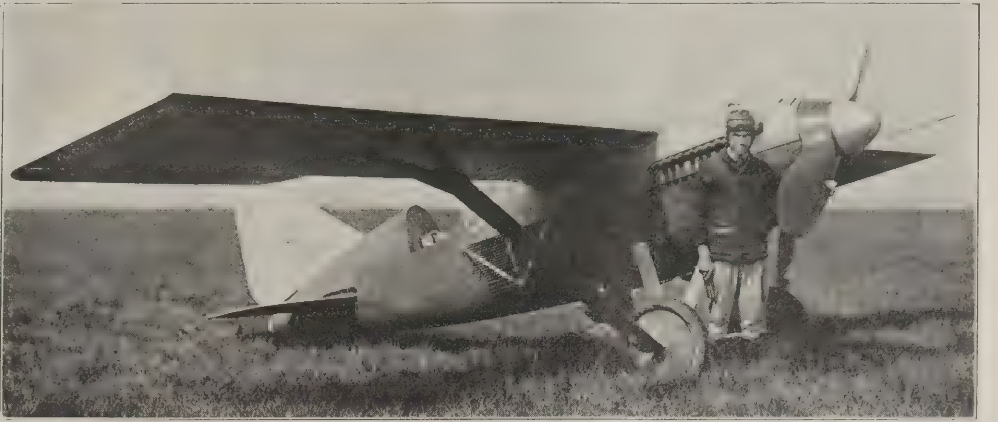
They stayed at Westfield over night and the next day carried a number of passengers. Then they left Westfield and proceeded to Cleveland and landed at the Logan Flying Field. Remaining at Cleveland all night, they left next morning for Dayton, Ohio, landing on Wilbur Wright Field, where very fine service was given by E. A. Johnson, the Curtiss agent. A mechanic is sent out to meet all ships that land on this field. They filled up with fuel here, and left on the last leg of their journey. They ran into a rain and thunderstorm over Cincinnati and another at Georgetown, Ky., but they kept right on and finally landed at Lexington on the race-track.

They carried a number of passengers at Lexington the next day, and then left for Barbourville with another passenger, M. T. Mayer, sixty-five years of age, of Lexington. Mr. Mayer, who is a railroad supervisor, wished to inspect the railraod and main roads from Lexington to Barbourville, and took the advantage of doing it by aeroplane.

Landing at Barbourville, they were greeted by the whole town and received a wonderful welcome. Mr. Mayer was much pleased with his trip, which he reported very successful for his mission.

Throughout the entire trip no mechanical trouble as experienced with either engine or plane, and, considering the fact that Burton weighed 230 pounds and Pilot Beaver 150 pounds, and there were also two suitcases on board, very good time was made.

THE S. E. J. COX GORDON-BENNETT EXPEDITION



THE best equipped sporting expedition that ever left the United States is now on its way to France with one hundred tons of freight and baggage and fifteen men for the purpose of bringing back the Gordon Bennett Cup to America.

There probably never has been held a sporting event of such world-wide importance and interest as the Gordon Bennett Cup Race which will be staged in France the week of September 27th to October 3d. The nations of the world will compete here for a cup that has now been held by France since 1914 and which all nations interested in aviation covet beyond anything else as it represents the supreme endurance in speed contests for a distance of 300 kilometers.

Italy, France, England, Switzerland, Belgium and the other nations of the world have been busy and are devoting the energies of their leading aeronautical engineers and their best mechanics to the construction of an aeroplane that would win this great contest and bring home the cup.

In the United States Mr. and Mrs. S. E. J. Cox have financed the construction of two aeroplanes which already in trial flights have broken all known world records for speed according to the reports of the pilots. Just exactly what the speed is that these planes will make has not been divulged, but it is known that it is considerably over 200 miles per hour, the planes being entered one by Mr. Cox and the other by Mrs. Cox and being known respectively as the Texas Wildcat and the Cacytuc Kitten. They are the result of very careful planning on the part of Mrs. Cox and her engineers with the result that a plane has been evolved much lighter and with less air resistance per horsepower by a considerable margin than anything that has ever been attempted up to the present time. The engine which develops over 400 horsepower offers less air resistance than the ordinary aerial engine developing 90 to 150 horsepower and many of the speed experts are willing to bet their last dollar that the Cox expedition will bring back the Gordon Bennett Cup.

While there are only two planes entered in the race, there are three completed planes being taken across with special parts and equipment on hand sufficient to build two more so that in case of accident or smash-up of any kind there is no possible contingency that can be imagined that has not been provided for in advance even to the important item of taking along all their own men who assisted in the construction of these planes and are familiar both with the engine and body of the plane.

The planes were built in the Curtiss Engineering and Motor Corporation plant at Garden City, Long Island. The work was carried out entirely under the supervision of Mr. T. J. Johnston who was Mrs. Cox's personal engineer and kept in close touch with her on all questions of importance. The models for these planes were made and designed at the Curtiss plant and during these experiments a great many new ideas were learned and developed. Among others were a new shape wing and a new shape fuselage.

Mr. and Mrs. S. E. J. Cox who are responsible for financing the expedition which has cost close to a quarter of a million dollars is the president of the General Oil Company of Texas and is one of the leading oil operators in the Gulf State.

Facts About the Gordon-Bennett Race

Date—September 27th-October 3rd.

Distance—Three hundred kilometers (186 miles) consisting of three legs of sixty-two miles each.

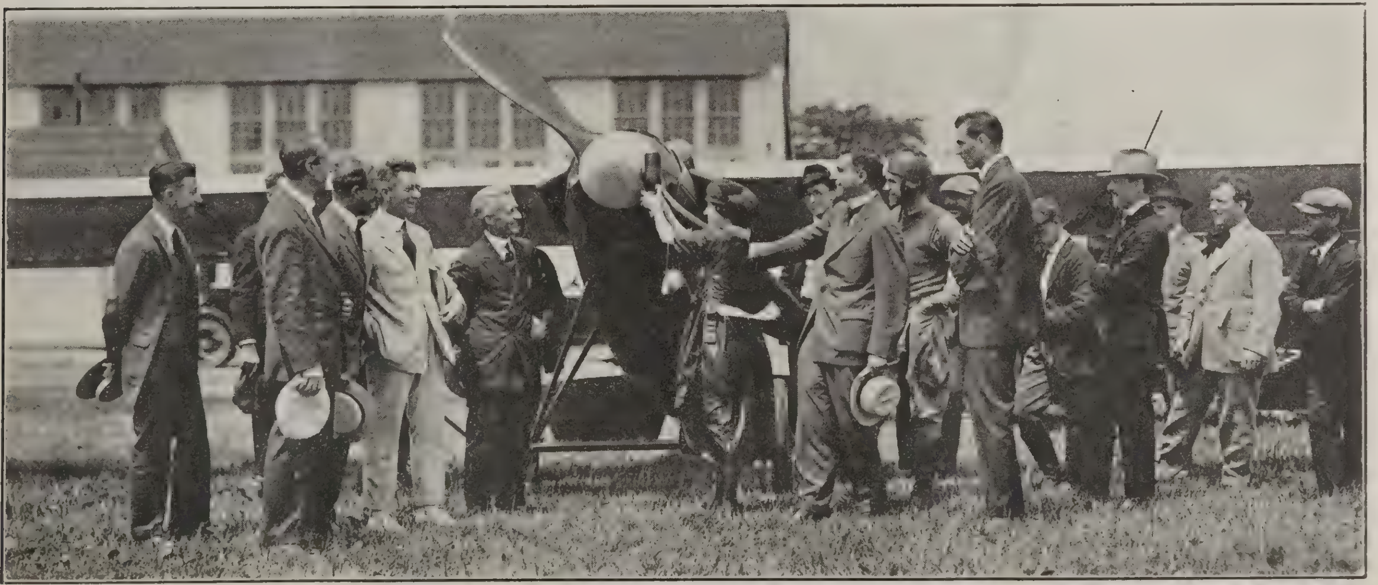
Course—Located near Paris over the finest flying country in the world.

Countries to be represented—America, England, France and Italy. Each country is allowed three entries.

Previous history:

Year	Winners	Country	Remarks
1909.	Glenn H. Curtiss........	America	Mr. Curtiss used a Curtiss biplane attaining a speed of 43 m.p.h There were seven entries.

(*Continued on page* 881)



Mrs. S. E. J. Cox christening the "Texas Wildcat," one of the Cox entries in the Gordon-Bennett Race

The AIRCRAFT TRADE REVIEW

To Build Morane Saulnier Planes in U. S.

Mr. Temple N. Joyce, representing the Morane Saulnier aeroplanes in the United States, is doing a great deal of demonstration work with his new Morane A. R. two-seater parasol monoplane.

A successful demonstration was given recently in Baltimore, a number of business men from that city witnessing the flights. Tests were given before the army officials at Bolling Field, Washington, D. C.

Mr. Joyce at present is doing his demonstration work with the ultimate object of organizing a company to manufacture Morane Saulnier planes in this country, and he has aroused much interest in the project. It is expected that actual construction will begin within six months on these machines.

Prohibitionists to Make Aerial Campaign

Germantown, Ohio.—Before an enthusiastic crowd of neighbors, admirers and party adherents that overflowed the athletic field at Miami Military Institute here the Rev. Aaron S. Watkins, standard bearer of the Prohibition party, and D. Leigh Colvin, his running mate, formally accepted their nominations.

The candidates will carry the campaign of their party into every section of the country by aeroplane. Decision for the aerial campaign was reached by the national executive committee.

Fredericton to Be on Halifax-Montreal Run

Fredericton will be one of the Canadian Air Board's stations, on the Halifax-Montreal air route, according to announcement. The city affords ideal conditions for landing hydroaeroplanes. It is expected that a machine with a crew of twelve will be located here.

Radio Equipment for Seaplanes

Specifications have been issued to the commanding officers of naval air stations and detachments for the installation of radio equipment in the tails of types H-16-A and F-5-L seaplanes. This method of installation has been adopted as standard. Lieut. Comdr. V. C. Griffin, Jr., U. S. N., and Lieut. E. B. Koger, R. F., are at Hampton Roads for the purpose of flying the Vought aeroplane from the Deck of the U. S. S. Oklahoma.

Los Angeles Company to Build Aeroplanes

Southern California re-enters the field of aircraft manufacturing once more with the announcement that early in August operations were commenced in the plant of the Davis-Douglas Company, 421 Colyton St., Los Angeles, under the supervision of Donald W. Douglas, noted for his successful work as an aeronautical engineer. The first plane is to be finished in November.

The company is developing an advanced type of plane for commercial use and expects to demonstrate the ship before Post Office, Army, Navy and civilian authorities early in November. While the details of the plane are still kept secret the builders expect that it will create a new standard of performance for commercial planes.

David R. Davis, president of the company, and a well known Los Angeles man, is a pilot and has been interested in aeronautics ever since the first aviation meet on Dominguez field. He is taking a personal interest not only in the construction work but also contemplates piloting the plane.

Donald W. Douglas, vice-president and general manager of the company, is regarded as one of the most successful aircraft designers in the country. As chief engineer for the Glenn L. Martin Company he produced eleven different types of aircraft, including the famous Martin twin engined bomber, mailplane, torpedo plane and the 12-passenger transport. He was formerly chief civilian aeronautical engineer for the U. S. Army and at the present time is Consulting Engineer for the U. S. Air Service and member of the Aircraft Standardization Committee of the Society of Automotive Engineers.

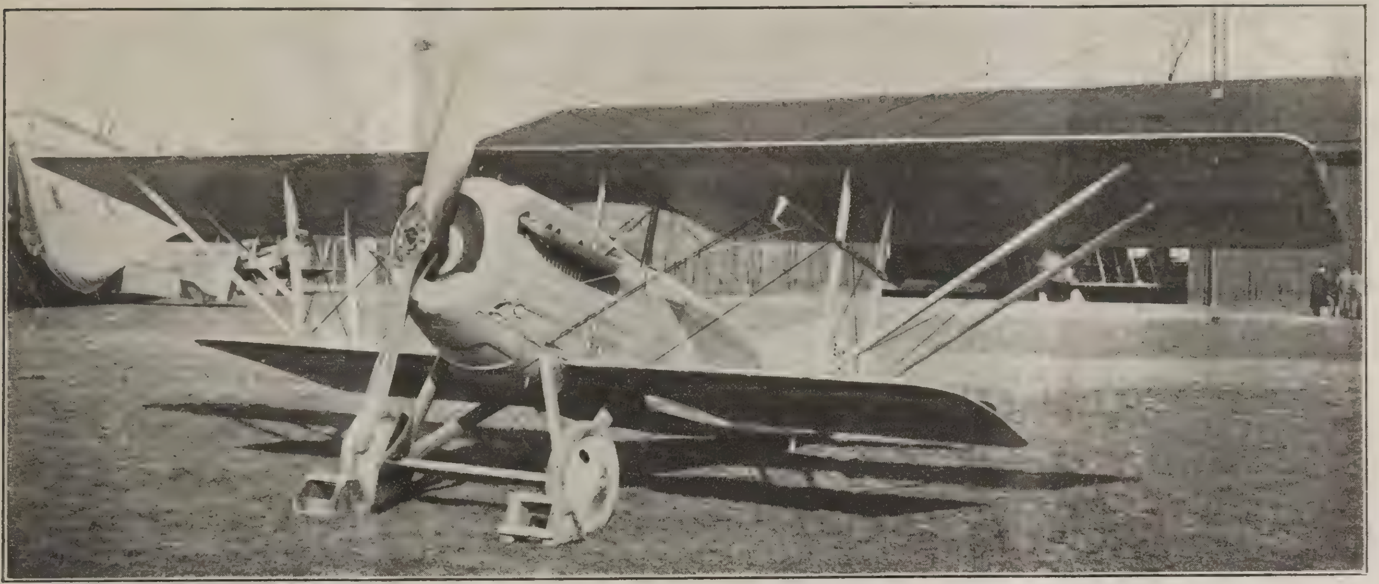
Every member of the organization working on the new plane has been associated with Mr. Douglas in his construction work for several years, most of the men having been with him in Southern California in 1915 and 1916 when he was designing planes for the U. S. Army and Navy and the Netherlands East India Government. Among the members of the organization are H. J. Goodyear, factory manager, George Strompl, purchasing agent, Henry Guerin, metal foreman, Ross Elkins, cabinet shop foreman, and George Borst, mill foreman.

The new plane, which will be in production after the first of the year, has been designed after an exhaustive study of conditions in the aeronautic industry both in the manufacturing and operating fields. After a complete survey of conditions the type of plane was selected as offering the best possible combination of adaptability to many uses, safety, convenience, low initial cost and low upkeep cost. The plane is standardized throughout, all parts being built in America and immediately available.

The first machine will not be finished as a passenger plane but will have a large cargo cabin in which either live or dead weight can be carried as it is the purpose of the builders to demonstrate the all-round possibilities of the aeroplane. The compartment will be finished to order in the later planes to acommodate mail, for the Aerial Mail service, passengers for companies in commercial work or as a combination passenger and mail-express plane.

A wide speed range has been provided, calling for a very low landing speed and a sufficiently high maximum speed. As a mail plane it will handle a ton of mail at high altitudes or a ton and a half over reasonable country where altitudes of over 10,000 feet will not have to be negotiated, besides 5 hours fuel and two pilots. As a passenger plane it will carry 5 hours of fuel, a pilot, 5 to 7 passengers and up to 1,000 pounds of additional mail, express or baggage.

The Bristol aeroplane presented to King Albert of Belgium, which His Majesty uses on frequent occasions and in which he flew to the Olympic Games at Antwerp



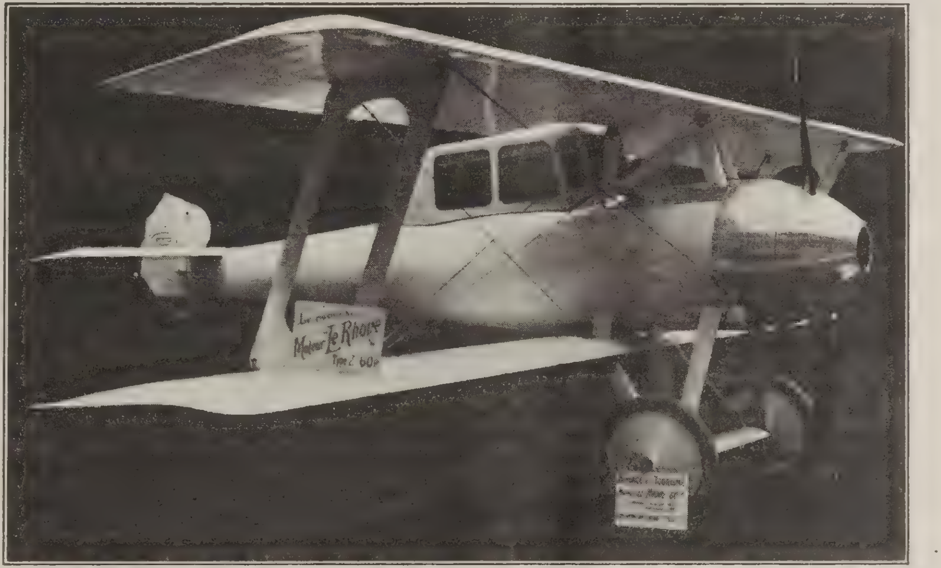
De Marcay single seater pursuit plane equipped with a Hispano-Suiza 300 H.P. engine

EDMOND DE MARCAY AEROPLANES

The post-war types of aeroplanes of the French aeronautical constructor Edmond de Marcay, who during the war built a large number of pursuit planes, are attracting much attention abroad.

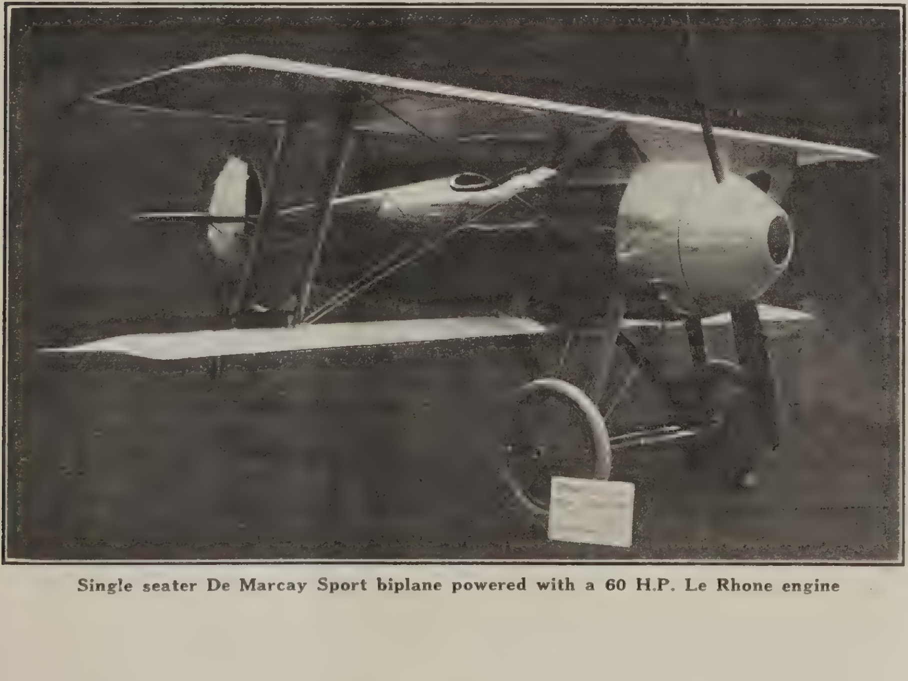
Three types of sporting planes have been produced, one with an engine of 10 horsepower and two with the 60 H.P. Le Rhone engine. A single seater military pursuit plane, with a 300 H.P. Hispano-Suiza motor, has also been built and flown with excellent results.

The Passe-Partout, claimed to be the smallest aeroplane in the world, is a tiny single-seater biplane equipped with the opposed two cylinder, 10 H.P. A, B, C engine. The fuselage is of monocoque construction, as in the case of the other two de Marcay machines, but the section is rounded rectangular rather than circular. The engine is mounted above the nose of the *fuselage,* presumably to get the propeller shaft as high as possible so as to allow of getting sufficient propeller clearance.



De Marcay two seater Limousine Tourer equipped with a 60 H.P. Le Rhone

This tiny biplane has a span of only 18 ft., 1½ in., and a length of 10 ft., 5½ in. It weighs 220 pounds, including gasoline and oil for a flight of two hours, and can fly at a speed of 68½ miles an hour. The gas consumption is very low, averaging 1.32 gallons an hour. The main planes are straight without dihedral, and the bracing is of the simplest possible type, one lift cable and one anti-lift cable. Lateral control is by warping the upper plane. To allow of doing this the interplane struts, of which there is one on each side, are tapered toward the top while they are wide at the bottom so as to reach both lower spars. The warp cables pass from front and rear top spars down over pulleys in the bottom plane and hence to the control lever. This would appear to be quite a neat way of arranging the lateral control in a small machine, as the fitting of *ailerons* entails a considerable amount of extra work, and also adds somewhat to the weight.



Single seater De Marcay Sport biplane powered with a 60 H.P. Le Rhone engine

The tail plane, as on the other machines of de Marcay, is of the lifting type, and is covered with three-ply wood. The elevators are fabric-covered, but both fin and rudder are covered with ply wood. The tail skid is very simple and neat, consisting of a laminated spring of wood. A diminutive vee under-carriage with rubber shock absorbers is fitted.

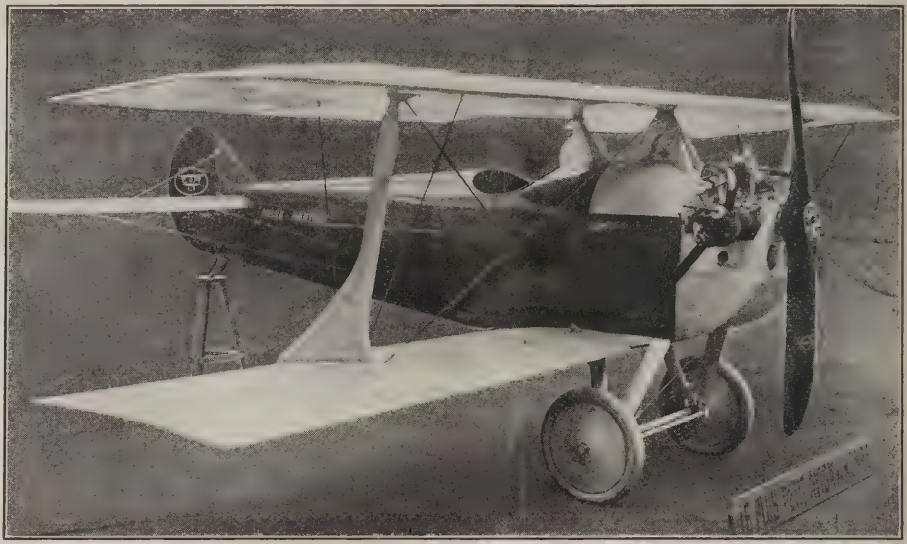
The single-seater Sport biplane, equipped with a 60 H.P. Le Rhone engine, is of very neat design. It is of monocoque fuselage and fitted with a propeller spinner, making good streamline with the engine cowling. This machine has a wing span of about 16 feet 5 inches and the overall length is 13 feet 9 inches. Lateral stability is obtained by ailerons on the lower wings. The weight of the plane with fuel for 2 hours is 408 lbs. The speed is 118 miles an hour maximum and 28 miles per hour minimum. A factor of safety of 12 is carried out with this plane. The loading of the machine is 5.73 lbs. per sq. ft. and 10 lbs. per horsepower.

The third machine, although larger than the two described, is also quite small, and is of a two-seater limousine or coupe type. It is known as the Tourer and also uses the 60 H.P. Le Rhone 9-cylinder motor. The cabin structure on the fuselage is quite novel. The construction is similar to the single seater and the machine has a wide range of vision. Ailerons are located on the lower planes only. The span is 19½ feet and the length 16¾ feet. The high speed is 93 miles per hour and landing speed about 30 miles an hour. The weight with two hours fuel is 485 lbs. The wing loading is 5.11 lbs. per sq. ft.

The fast single-seater pursuit plane is one of great interest, and equipped with a 300 horsepower Hispano-Suiza engine, it made 156 miles an hour near the ground and 128 miles per hour at 19,685 feet. A climb of 16,400 feet was also accomplished in 16 min. 16 sec.

It is a biplane carrying two machine guns. The upper wing has a span of 30 feet 4 inches and the lower a span of 18¾ feet. The total weight is 2,368 lbs.

The overhang of the upper plane is supported by two diagonal struts on each side attached to the lower wings at the fittings of the main supporting struts.



The Passe-Partout, the smallest aeroplane in the world, using a 10 H.P. A. B. C. engine

PHENIX FIREPROOF DOPE

One detail which until recently has not kept pace with the other safety improvements in aircraft work is the dope for varnishing the cloth covering the wings, tail members and fuselage.

With the idea of producing fire-proof dopes, Nelson S. Hopkins, President of the Phenix Aircraft Products Company, of Williamsville, N. Y., developed the Phenix Fireproof Dopes and doping methods to produce a thoroughly practical and reliable fireproof dope for aircraft work, both for the aeroplane and dirigible.

At the Third Pan-American Aeronautical Congress, at Atlantic City, Mr. Hopkins showed the films and cloth doped with Phenix Fireproof Dope which aroused a great amount of interest and favorable comment. These Phenix Fireproof Dopes are the result of experimental work started over five years ago when developing the nitrate and acetate dopes after the supply of doping material from Europe was shut off by the war.

The first result of his work was the standardization of four coats of nitrate dope and two of acetate, which has stood the test of time for dopes of their nature, but they were inflammable and would not prevent the spreading of fire. Many experiments were made as to the method, materials and tests extending over a long period of time and weather conditions, which have resulted in the production of a thoroughly practical and reliable fireproof dope, having all the usual and necessary characteristics and are treated and applied in the same manner as nitrate and acetate dopes. They have the life, shrinkage, finish, proof against oil and gasoline and of fine appearance. They will spread and dry readily and are plastic and flexible with freedom from cracking, besides have in addition the desirable and vital property of being absolutely non-inflammable.

Phenix Dopes have a cellulose base but the active materials to produce the fireproofing properties are dissolved in the solution and not an added fire-resisting pigment which settles, giving a variable result with greatly increased weight. The dopes from the top of the barrel, or can, are as fireproof as those from the bottom. They are not a paint. The added weight over that of six coats of clear nitrate or acetate dope runs from 1½ to 2 ounces per square yard.

With Phenix Dopes it is not necessary to have an inner envelope or covering or doped cloth under the cap strip which increases the weight greatly.

Phenix Fireproof Dope must be applied to new and undoped cloth to obtain the non-inflammable properties. It cannot be used with or in connection with the usual dopes and still retain the non-inflammable properties, neither can it be applied over other dopes.

Phenix Doping Methods are based upon the plan that the cloth or fabric is first fireproofed and then every layer of dope that is applied is fireproofed of itself so that the resultant fabric is absolutely fireproofed at every step as well as when completed.

In detail the cloth is first fireproofed by thoroughly saturating the linen or cotton cloth with Phenix Fireproofing Solution No. 152 when stretched over the frame, or preferably in a wooden tub, before covering, and after thoroughly drying the cloth to apply three to six coats of Phenix Fireproof Dope Clear, No. 125. For a Clear Dope finish six coats of Clear Dope are used. For those desiring a longer life the use of three coats of Phenix Fireproof Aluminum Dope No. 120, over three coats of Clear Dope, is very highly recommended. Phenix Dopes work as well on cotton as on linen and are shipped already mixed ready for using.

Interesting and simple tests for non-inflammability were made by holding films and strips of Phenix Fireproofed Cloth and doped cloth horizontally and lighting the outer end and, while the dope and cloth will char under the intense heat, the flame will not spread, showing the absolute non-inflammability of Phenix Fireproof Dopes.

Similar tests were shown of the generally used dopes and films, and the tests on films, especially, showed the great advance of fireproof dope.

Phenix Fireproofing Solution can also be used to great advantage for fireproofing parachutes and cloth flying suits, as there is no tendency for the flame to spread should the parachute or suit be exposed locally to the direct flame.

The Phenix Fireproof Doping Methods, especially the Aluminum Finish, can be used to great advantage for the doping of the outer covering of dirigibles, as it gives a fine appearance and a fireproof or non-inflammable surface.

Plan Transfer of Oriental Mail by Aeroplane from Victoria to U. S.

Local officials of the mail service in Seattle, Washington, are awaiting word from the postal authorities at Victoria, B. C., concerning the inauguration of an aerial mail service for the transfer of Oriental mail rom Victoria to the United States through Seattle. It has been decided that it is possible to land a hydroplane near the wharf where Oriental liners tie up in Victoria. At the present time the bulk of the mail sent from the Un'ted States to Victoria via the northern route is sent from Seattle to Victoria for transfer to liners leaving that port.

(*Continued from page* 864)

election of certain persons as members of the Club whom the above mentioned governors sought to elect without first proposing their names in writing and posting their names, as required under the by-laws of the Club; and,

WHEREAS, it is evident that one of the purposes sought in suspending Mr. Woodhouse was to prevent him from handing to the Board of Governors the protests of five Governors and forty members of the Club against the holding of the irregular meeting called for August 16th, and a notice of call of the special meeting of August 28th which Mr. Woodhouse was instructed to hand to the Board and he had notified the Secretary of the Club on August 3rd of his intention to do so at the meeting of the Board of August 4th; and,

WHEREAS, it is shown by the minutes of the meetings of the Board of Governors of the Club that Mr. Woodhouse's motives in opposing the irregular and illegal actions of said governors were of the highest ethical character, and he specifically urged the necessity of upholding the law by complying with the Membership Corporation Laws of the State of New York and the By-Laws of the Club and maintaining the unexcelled integrity, dignity and traditions which have made the Club a great national institution; and,

WHEREAS, it is evident that the plan supported by Mr. Woodhouse and other governors and members of the Club—which provided for taking into the Aero Club of America those members of the American Flying Club who were officers in the Air Service, and those of other classes who could meet the requirements for membership in the Club, and of continuing the better suited, more centrally located, sumptuous and less expensive Club headquarters at 297 Madison Avenue—was a better plan in every way than the plan put into effect, by irregular actions of the said eight governors; and,

WHEREAS, it is shown by the many letters, telegrams and statements of Governors and members that Mr. Woodhouse's courage, integrity and good judgment in starting action to protect the legal, moral and financial rights of the absent members and governors of the Club and the Club's best interests are generally appreciated and approved by the members of the Club; be it

RESOLVED, that the action of the said eight governors be and is hereby rescinded and Mr. Woodhouse be and is hereby restored as a member and Governor of the Club, with the same full rights as a member and Governor which he enjoyed prior to the unfortunate and irregular action of the above mentioned Governors; and that the expressions of appreciation for Mr. Woodhouse's extensive contributions to the advancement of aeronautics and the upbuilding of the Club which have been spread upon the Club's records during the past six years be and are hereby renewed and confirmed.

Resolution Appoints Special Committee to Act for the Members

WHEREAS, an emergency has arisen in the affairs of the Aero Club of America which may require legal action to compel observance of the by-laws of the Club and the Membership Corporation Laws of the State of New York; and,

WHEREAS, it is necessary that a committee be appointed with power to act on behalf of the governors and members of the Club who are in just cause dissatisfied with the irregular actions of certain officials and members of the Club who have disregarded the rights and prerogatives of the membership of the Club and violated the Membership Corporation Laws of the State of New York;

BE IT RESOLVED, that a committee consisting of Major Charles J. Glidden, Brig. General Robert K. Evans, Henry Woodhouse, Captain Robert A. Bartlett, and Lt. William B. Atwater, U. S. N. R. F., be hereby authorized to take whatever steps are necessary legally or otherwise to carry out the purpose of this meeting as stated in the proxy forms and notice of this meeting, said committee being authorized to appoint a chairman who shall sign legal papers for the Committee, when so instructed by the Committee, and a vice-chairman who shall be empowered to act in the absence of the Chairman; and that the said committee be authorized to reconvene this meeting whenever it is deemed necessary for the best interest of the Club and its membership to do so; and that this committee be also authorized to draft and submit to the membership of the Club for action at its regular annual meeting on November 8th, 1920, revised by-laws, intended to democratize the Club, giving the members of the Club a voice in the Club's affairs and precluding a repetition of the recent unfortunate experience when a few members, by high handed methods and by utter disregard of the legal and moral rights and prerogatives of the members, assumed control of the management of the Club.

Old Board of Governors Restored

WHEREAS, the Membership Corporation Law of the State of New York provides that the directors of a membership corporation shall serve until the expiration of their term unless they voluntarily resign; and,

WHEREAS, by vote taken at the irregularly called "special meeting" of the Aero Club of America, and by using proxies, obtained by irregular methods and misrepresentations, some individuals who have obtained temporary control of the Club have claimed to have abolished the Board of Governors which had been duly elected by the entire membership of the Club at regular annual meeting and have appointed governors of their selection in place of the Governors duly elected by the entire membership of the Club;

BE IT RESOLVED, that the Committee heretofore named, consisting of Major Charles J. Glidden, Brig. General Robert K. Evans, Henry Woodhouse, Capt. Robert A. Bartlett and Lt. William B. Atwater, U. S. N. R. F., be and are hereby authorized to institute legal proceedings to restore the said Board of Governors as it existed on August 3rd, 1920, to their lawful offices, as provided for by the Membership Corporation Law of the State of New York, and are hereby authorized to employ counsel for said action.

Bank Ordered to Honor Only Checks for Operating Madison Avenue Club House

BE IT FURTHER RESOLVED, that the Lincoln National Bank, the depository of the funds of the Aero Club of America, be duly notified that the so-called meeting of the Aero Club of America held on August 16, 1920, was irregular and that the action taken at and following said meeting by the individuals was illegal and violated section 7, section 13, and section 14 of the Membership Corporation Law of the State of New York and said Lincoln National Bank is hereby ordered not to honor any checks drawn against the funds of the Club for any purpose other than for the payment of obligations incurred in connection with the operation of the Aero Club of America at its established headquarters, located at 297 Madison Avenue, New York City.

BE IT FURTHER RESOLVED, that the Lincoln National Bank be instructed not to deliver, sell, or in any way dispose of any of the bonds and securities deposited in and held by said Bank for the Aero Club of America, excepting by written authorization from the Chairman or the vice-Chairman of this Committee.

BE IT FURTHER RESOLVED, that the Secretary and other officials of the Club be and they are hereby ordered and directed to cause to be returned to the headquarters of the Club at 297 Madison Ave., New York, all the books, records, furniture, pictures, and trophies, and all other property of the Club removed from said headquarters since August 16th, 1920, and the Secretary be instructed to notify the members of the Club that no change of headquarters will be made until they have had an opportunity to consider the financial obligations connected with such changes and have been given a fair opportunity to vote upon said proposal.

Resolution Restores "Flying" as Club's Official Organ

Some of the confederates of these schemers are stockholders and interested in a new aeronautic publication and they conceived the plan of making this publication, in which they are

(*Continued on page* 874)

Increase Your Income and Help Aeronautics By

BELIEVING that we can do more for the development of aeronautics by establishing an **Aeronautic Circulating Library in every community** than by any other method, not excluding large government appropriations, we invite the co-operation of progressive men and women, readers of this magazine, who would like to participate in this progressive movement **by establishing an Aeronautic Circulating Library in their community,** which will become a center and clearing house of aeronautic activities in their community, just as **the Aeronautic Library** of New York has been the clearing house of aeronautic activities in New York.

Six years of experience have proven that an Aeronautic Library is a powerful factor and the headquarters of aeronautic activities with far-reaching influence.

More people visit our Bookshop at 299 Madison Avenue, New York City, each day than visit ten clubs. These people come and write from every part of the world, ask our advice, guidance and information—which we gladly supply.

The Aeronautic Library was founded in 1914, as a philanthropic information bureau and free library. Then the demand for books became so large that the purpose had to be extended to include the publishing and selling of aeronautic books, magazines and maps and the distribution of aeronautic articles of a literary, scientific or artistic character; to seek, collect, distribute and make public authentic information relating to our nation's aeronautic needs; to foster the upbuilding of our aerial defenses, encourage scientific research, develop the national aeronautic resources and arouse active public interest in aerial travel and aerial transportation.

As very little existed at that time in the direction stated above, we had to do the pioneer work in this line—which we undertook with pleasure. We started out to be purely a philanthropic service organization, but the demand for aeronautic books and magazines alone became so large as to make the Library an extensive business enterprise.

People of all classes and all ages come to our Bookshop. They know they are welcome; and we are glad to supply them with information and advice. They can look over and read books and magazines free of charge, and read the latest aeronautic news on the bulletin board. Inventors and experimenters bring us their models and exhibit them in our Shop. Aviators come to plot out their flights on our maps, and like engineers, and students and others, come regularly to buy the latest copies of "Aerial Age Weekly", "Flying", "Air Power", and other magazines and the latest books and aeronautic maps. Scores of men, women and young people come to borrow books, buy flying model aeroplanes, aluminum model planes to be used as automobile radiator ornaments, statuettes, aeronautic jewelry, and other aeronautic articles and souvenirs.

Often a limousine stops at the Library and a young boy or girl comes in, accompanied by the father or mother, to buy a toy aeroplane. Soon they become interested in the many aeronautic things they see and end by booking for aeroplane flights, joining the Aerial League of America, acquiring aeronautic books and a "Winged America" for their library, an aluminum model aeroplane for their automobile radiator cap, subscribe to aeronautic magazines. They then go forth into the world to carry the wonderful message of aerial progress, which sends us other people who invariably do likewise.

Banks call to inquire regarding the standing of firms and individuals; exporters inquire about manufacturers who can supply planes, motors, and accessories; lawyers send their clerk to consult the textbook on Aerial Laws and inquire regarding the latest legal decisions; insurance companies call for data on aeronautic risks; chambers of commerce and committees call to find what aviators are available for exhibition flying, and for information about requirements for landing fields; prospective buyers call to find out where they can buy aeroplanes, motors and accessories of all kinds. During the war scores of young men would call to find out how to join the Air Service, and relatives would even call to inquire whether we knew the whereabouts of their boys overseas, or to ask how they could assist their boys in passing their examinations, getting advance training, get transfers to better fields, get their flying pay. Others would seek information as to how they could help to obtain larger aeronautic appropriations, how they could effectively oppose the cutting of the flying pay, etc., etc.

The secret of our success has been that we have rendered and are rendering valuable service in a pioneer and distinctive line of human endeavor.

INCOME FROM AERONAUTIC LIBRARY WILL MORE THAN PAY FOR OFFICE AND CLERK FOR LOCAL AERO CLUB OR AERIAL LEAGUE

IT is a fact that many automobile clubs derive substantial incomes from the sale of maps, guides, gasolene and supplies.

Many Aero Clubs and Aerial Leagues would be established and would be able to do effective work if they could support an office and a clerk. This they can do by establishing an aeronautic library in connection with the Aero Club or Aerial League offices. The Library's customers will become members of the organization and the members of the organization will become customers of the Library. One helps the other—and both help the development of aeronautics.

If you have not as yet an Aerial League in your community write to Major Charles J. Glidden, Aerial League of America, 280 Medison Avenue, New York City, who will be glad to advise you how you can organize a section of the Aerial League of America in your community.

shing an Aeronautic Library In Your Community

HOW YOU CAN ESTABLISH AN AERONAUTIC LIBRARY AS A PROFITABLE AND PERMANENT BUSINESS

YOU can establish an Aeronautic Library (which will bear the name of your community) in connection with almost any activity in which you are engaged, if you have a shop or an office to use, or you can establish it in partnership with the local newspaper, hotel, book or stationery shop, insurance, real estate, or other similar enterprise.

The Pensacola, Florida, Aeronautic Library is located in the Hotel San Carlo, the leading hotel there; the Cincinnati Aeronautic Library is operated in connection with the Pan-American Aircraft Company; the Manila (Philippine Island) Aeronautic Library is connected with an aeroplane agency; aeronautic libraries are being established in China, Brazil, and Bolivia in connection with aircraft agencies, one is being established in Texas in connection with an Aero Club. An Aeronautic Library makes an attractive addition to almost any business or organization.

For less than one thousand dollars we establish your Library and supply you with the necessary stock of aeronautic books, magazines, maps, art works, model aeroplanes, aeronautic jewelry, propeller clocks, goggles, and other aeronautic novelties and articles required to make your Aeronautic Library attractive and complete. We advertise your Library free in our advertisements, so that all the people interested in aeronautics in your community will call on you and become your customers—and also become members of your Aerial League, if you decide to organize a League.

Your Library thereupon becomes not only the aeronautic center and clearing house in your community, but also the distributor and selling agent for all the aeronautic books, including the Aeronautic Reference Library, which consists of six large textbooks dealing with the six main branches of the Aeronautic Science and Art, as follows:

The Textbook of Applied Aeronautic Engineering.

The Textbook of Aerial Laws and Regulations for Aerial Navigation.

The Textbook of Aero Engines.

The Textbook of Naval Aeronautics.

The Textbook of Military Aeronautics.

The Aero Blue Book and Aeronautic Directory.

Also distributor for the following aeronautic magazines and maps; and articles:

AERONAUTIC MAGAZINES:

(1) "FLYING" (monthly), founded 1911, the largest and leading aeronautic magazine in the world which gives a broad survey of developments of aeronautics the world over. $4.00 a year; foreign $1.00 extra.

(2) "AERIAL AGE WEEKLY," founded 1912, the national aeronautic technical and trade paper which gives technical articles by leading authorities, and reports all current events and business prospects in aeronautics. $4.00 a year; foreign $2.00 extra.

(3) "AIR POWER" (monthly), founded 1915, publishes articles by leading authorities on military and naval aeronautics and illustrated review of world progress in military and naval Aeronautic Art and Science. $3.00 a year; foreign $1.00 extra.

AERONAUTIC MAPS:

(1) Official Aeronautical Wall Map of U. S. and Canadian Airways, giving the geographical aeronautical divisions of the North American Continent, the rules of the air, etc., $5.00 a copy. 50 x 43 inches, giving names of all communities on the Airways.

(2) Official Wall Map of the World's 1,100 Airways, with distances between places in miles and kilometers all over the world. connections between air lines and steamship lines and railroads, magnetic deviations, longest periods of daylight at different latitudes, etc. $5.00 a copy.

(3) Aeronautic Maps of different airways and portions of the United States.

MODEL AEROPLANES:

Model aeroplanes guaranteed to fly, different sizes and prices.

The "Liberty" automobile aluminum Radiator Cap Ornament, which is supplied in two types:

Type "A" with Automobile Radiator Cap Attachment, price $5.00.

Type "B" Paper Weight and Desk Ornament, price $6.00.

Also distributors and selling agents for propeller clocks, aeronautic jewelry, souvenir miniature propeller paper knives, rare aerial mail stamps with the cancellations of all the first aerial mail trips, which will attract all the stamps collectors in your community and other attractive articles and novelties for which there will be a large sale, especially during the Thanksgiving, Christmas and New Year's seasons.

For some of these aeronautic books there is a wide demand. For instance, every lawyer, insurance agent and doctor in your community should have a copy of the Textbook of Aerial Laws, because it is the only book that gives the adopted international, national and state aerial laws, aerial insurance information and international air medical standards.

Your chamber of commerce, city officials, banks, newspapers and business men and other people will want the wall map of the airways, which shows on that airway where your community is located.

A great many progressive people will want books and magazines because they want to be connected with the aeronautic movement in this pioneer stage, when it is beginning to extend its usefulness to every branch of human endeavor, and the tremendous strides forward of aeronautics open wonderful possibilities for the employment of ingenuity, genius and skill and business opportunities as great as were opened by the railroad, automobile and telegraph industries. And there are problems of engineering as huge as were solved by the world's master builders; juridical questions to be decided as stupendously difficult as a statesman ever was called upon to settle; possibilities for the development of international relations greater than were ever conceived; problems of transportation to be solved by the application of aircraft as complex as have ever confronted economists; opportunities to gain distinction dazzling enough to satisfy the most ambitious.

Every automobile owner is a prospective buyer of an aluminum plane for his automobile radiator cap; and every boy is a prospective buyer of model aeroplanes, and you can teach boys to fly these models and organize them in teams and arrange to have them compete for the Aerial League of America's trophies and prizes offered for model contests.

Your Aeronautic Library will make you the Community's Aeronautic Advisor and will lead to popularizing aeronautics, establishing landing fields, standardizing aerial laws and regulations and insurance rates, extension of aerial mail service, creating demand for aerial transportation and to other important developments which will help the progress of aeronautics and of your community.

If you are ready to establish an Aeronautic Library in your community write for full information to

THE AERONAUTIC LIBRARY, Inc.
299 Madison Avenue New York City

(*Continued from page* 871)

interested the official organ of the Club in place of *Flying*. The inside story of this publication and the connections of various individuals to this scheme will be told in affidavits to be filed in the Supreme Court if and when it becomes necessary and will amaze the aeronautic movement as much, if not more than the inside story of the conspiracies that have been conducted against the Club. This may not become necessary because at this meeting, by unanimous vote, it was resolved to restore *Flying* as the official organ of the Club, by the following resolutions:

WHEREAS, the magazine "Flying" which was started by the Aero Club of America in 1911 and turned over to Mr. Woodhouse after a few months, when it had a monthly deficit of $1,200, which Mr. Woodhouse assumed, has been the official organ of the Club for the past eight years; and,

WHEREAS, "Flying" has been the most powerful and influential factor in changing the status of the Club from a small insolvent organization to a self-supporting, national organization; and,

WHEREAS, the publishers of "Flying" assisted the Club by generously supplying monthly copies of the magazine at prices ranging from only six cents to fifteen cents a copy during the past eight years, or an average of less than half of the cost and regular price of the magazine, and supplied thousands of copies of the magazine which the Club ordered sent to Air Service camps and to authorities in the United States and overseas, for which no payment has been made; and

WHEREAS, the members of the Club paid their dues for the current year with the understanding that they are to receive "Flying" each month; and,

WHEREAS, eight Governors of the Club at the meeting of August 4th, 1920, assumed upon themselves the authority to discontinue "Flying" as the official organ of the Club because "Flying" very properly printed the affidavits filed in the Supreme Court in connection with the action instituted to safeguard the rights and interests of the absent Governors and the members of the Club and in furtherance of the Club's best interests and welfare; and,

WHEREAS, the records show that the said Governors were repeatedly requested during the past three months by Henry Woodhouse and Major Charles J. Glidden to submit all the facts, evidence, and affidavits to the twenty-four governors of the Club and the entire membership of the Club and they refused so to do, and the publishers of "Flying" offered to print any and all the statements and affidavits of said eight Governors at cost of printing so as to enable the said Governors to present their views to the membership of the Club through the columns of "Flying," but said Governors refused to avail themselves of said opportunity;

BE IT RESOLVED, that the action of said Governors be and is hereby rescinded and "Flying" be and is hereby confirmed as the official organ of the Club and the publishers be authorized to continue sending a copy monthly to each member of the Club in good standing for which the Club will pay the special reduced price of fifteen cents a copy and the treasurer of the Club be and is hereby authorized to pay monthly the bills for said monthly copies of "Flying" sent to the members, in accordance with the practice heretofore established regarding said payments.

BE IT FURTHER RESOLVED, that the sentiments of appreciation of the generous and helpful support given to the Club by the publishers of "Flying" heretofore spread on the records of the Club be and are hereby renewed and confirmed.

Members of Flying Club Who Qualify for Membership Invited to Join Aero Club of America

WHEREAS, it is agreed that it would be for the best interest of American aeronautics to have one club in New York City instead of two; and,

WHEREAS, there are approximately 600 members of the American Flying Club who have expressed their desire to join the Aero Club; and,

WHEREAS, the Aero Club of America has a well suited, centrally located and sumptuous Club House at 297 Madison Avenue which it can obtain for a period of one or more years upon payment of a rental of only $12,000 per year, which sum is less than half of the rental and taxes of the less suited club house of the American Flying Club; and in view of the fact that it costs less than $15,000 per year to operate the Aero Club House, as against over $50,000 per year to operate the Flying Club House; and also in view of the fact that in the said Flying Club House members sleep in dormitories, with a number of men sleeping in the same room, which is not in keeping with the high standard and dignity of a sportsmen's club and national institution like the Aero Club of America; and,

WHEREAS, the Aero Club of America is self-supporting and has a treasury surplus and will continue to be self-supporting and have a treasury surplus if it continues to occupy its present headquarters at 297 Madison Avenue, but would be plunged into a deficit if it assumed the obligations of taking over the operation of the Flying Club House;

BE IT RESOLVED, that an invitation be and is hereby extended to those members of the American Flying Club who desire to join the Aero Club of America, to apply for membership in the Aero Club of America, with the understanding that the headquarters of the Club will be at 297 Madison Avenue, New York City; and that those members of the American Flying Club who qualify for membership in the Aero Club of America under the conditions provided in the by-laws of the Club, and adopted and confirmed at the regular annual meeting of the Club, held in November, 1919, be admitted to membership in the Club.

Conducting of Contests Urged

WHEREAS, it has been reported that it is the policy of the announced consolidated Aero Club of America with the American Flying Club to call off several important National and International events planned or approved by the Board of Governors of the Aero Club previous to August 16th, 1920; and,

WHEREAS, it would hurt American aeronautics if said aeronautic events were called off;

BE IT RESOLVED, that it is the sense of this meeting that the Club activities as planned be carried into effect as follows:

(1) The National Balloon Race to be held on Sept. 11th, for which there are fifteen entries.

(2) The International Balloon Race to be held on Oct. 23rd, for which there will be eleven entries, including eight foreign.

(3) The New York-San Francisco Flights for the Pulitzer Trophy and cash prizes.

(4) The New York-Los Angeles Flight for the Pulitzer Trophy and cash prizes.

(5) The First Aerial Derby Around the World to be conducted in connection with the Aerial League of America.

Other resolutions adopted pledged the co-operation of the Club to the Government in connection with any action the Government may decide to take to investigate the so-called "Two Billion Dollar Aircraft Scandal." Also resolutions providing for certain actions to be taken in the event that it is found that evidence has been taken from the Aero Club of America files regarding alleged irregularities of members of the Club in connection with the aircraft program and aircraft contracts, and other resolutions which will be printed in future issues.

The meeting was adjourned subject to call by the chair or by the majority of the members of the special committee appointed at this meeting.

NAVAL and MILITARY AERONAUTICS

Army Planes Reach Nome, Alaska, from New York

Nome, Alaska.—The four United States aeroplanes flying from Mineola, N. Y., to Nome arrived at Nome from Ruby, Alaska, at 5:30 o'clock on August 24. The actual flying time from New York was 55 hours, Capt. St. Clair Street, head of the expedition, announced. The hop-off on the return trip to New York will be made in a few days.

The flight just completed by Captain Street's expedition has been made over territory never before flown over, and included extremely difficult flying over the Canadian Rockies. Although the four army DH-4B aeroplanes left Mineola on July 21, the aetual flying time of 55 hours from New York to Nome is an indication of the prospects of future commercial flying between New York and Alaska.

The other three pilots besides Captain Street were Lieutenant Clifford C. Nutt, Second Lieutenant C. H. Cumrine and Second Lieutenant Ross Kirkpatrick.

Washington.—Three of the Army aeroplanes which flew from New York to Nome, have reached Fairbanks on the return trip, the War Department announced as we go to press. Capt. Street, commander of the expedition, was delayed.

Aeroplane-Carrier Langley Ready in January

The Langley, which is being converted from the collier Jupiter into an aeroplane-carrier, is expected to be ready for service in January, and the vessel will be assigned to the Atlantic fleet. The Wright, which is being converted for similar use from a type "B" shipping-board ship, will be assigned to the Pacific fleet when ready for service next spring. Programs have been prepared outlining the work of the air detachments of the fleets during this fiscal year.

In the Atlantic fleet, F-5 boats, with the Shawmut as tender and the Sandpiper as auxiliary tender, will be engaged in development of communication, position-finding, and other work. NC boats, with the Harding as tender, will be used for distant overseas scouting; large bombing and torpedo planes of one unit will be located at Yorktown, Va., for study and development of employment of aircraft for bombing and launching of torpedoes, and a unit of small-type bombers will carry on similar work while based at Hampton Roads, and later they will be assigned to the Langley for tactical employment, and land machines, two to each ship, will continue with the Pennsylvania, Arizona, Nevada and Oklahoma.

In the Pacific fleet similar work will be carried on with F-5 and NC boats; torpedo planes will be based on San Diego, Cal., and land machines, two to each ship, will continue with the New Mexico, Mississippi, Idaho and Texas.

NC Seaplanes for Fleet Operations

Five of the large NC seaplanes have been assigned to operate with the U. S. Navy fleets, three on the Atlantic and three on the Pacific. These seaplanes, carrying crews of five men each, will be employed on scouting problems and long-distance work, for which they are well adapted, being fitted for navigation on the surface and with the radio direction compass. The definite program for their employment is being worked out by the Fleet Air Detachment commanders, Capt. George W. Steele, Jr., U. S. N., of the U. S. Atlantic Fleet, and Capt. H. C. Mustin, U. S. N., of the U. S. Pacific Fleet. The NC seaplanes will have destroyer tenders for these operations This is the first time seaplanes of this type have been thus employed and the work will begin before September 1.

Seventy Navy Aviation Commissions Open

At the Navy Department it is stated that the fact that seventy aviators who served in the World War with the Navy have the opportunity to secure commissions in the Regular Navy apparently is not generally known. So few applications from Reserve fliers have been filed, the Bureau of Navigation expresses a desire that the widest publicity be given to the opportunity which is open to competent aviators to secure a commission in the Regular Service.

Seaplanes Will Bomb Battleship Indiana

Washington.—Another old time American fighting ship—the battleship Indiana—is to be sacrificed to the cause of naval efficiency. In Lower Chesapeake Bay in September the vessel will be subjected to a rain of bombs from a squadron of naval seaplanes.

This will be the first actual test to be conducted by any navy to show the possibilities of direct attack upon warships from the air, according to American naval officers. Flying at heights ranging from 4,000 feet to about 8,000, six planes will demonstrate the practicability of hitting a target the size of a battleship, using for this purpose non-explosive bombs. The battleships will then be subjected to the explosive force of bombs, carrying a minimum of 1,000 pounds of TNT.

Aerial Hunters Keep Away from Alberta

Calgary, Alberta.—Neither aeroplanes, machine guns, battery guns, automatic guns, nor any gun larger than a 10-gauge may be used in Alberta to kill migratory wild fowl under the international agreement that has just been entered into with the United States as a participating factor.

Americans in Dirigible Flight Over London

London.—The British dirigible airship R-32 flew over London in the commencement of a twenty-four hours instructional flight.

The airship carried the American crew which is training in England to take over the dirigible R-38, which has been purchased by the United States Navy and is under construction at Bedford.

U. S. S. Harding on Air Duty

Navy Department orders issued on August 14 assigned the U. S. S. Harding to the fleet air detachment, U. S. Atlantic Fleet, for temporary duty in connection with NC seaplanes. The NC-2, which had been delayed on a flight from Florida, landed safely at the U. S. Naval Air Station, Hampton Roads, on August 13.

Aeroplane Turret Take-Offs Successful

The first flight of the new Vought aeroplane under test for the U. S. Navy from the turret platform of the U. S. S. Oklahoma was successfully accomplished August 11, and the following day four faultless take-offs were made from the turret, completing the test. The aeroplane acted satisfactorily on each trial, according to reports to the Navy Department.

Navy Smoke Screens from Air Bombs

Tests conducted by representatives of the Bureau of Ordnance, Navy Department, with smoke bombs designed to lay a smoke screen for naval vessels from aircraft, proved that a satisfactory screen can be laid in this manner. Experimental models of smoke bombs weighing fifty pounds were tested on August 11, but after the experiments it was agreed that a bomb weighing not less than 100 pounds would prove to be more satisfactory for the purpose for which the experimental models had been designed.

Balloon Target for Aerial Gunnery

The balloon construction class of the vocational school at Lee Hall, Va., has completed a target balloon designed for use in aerial gunnery practice. The balloon is an elongated sphere having a vertical axis of eighteen feet and a maximum horizontal diameter of twelve feet. A cloth target is suspended below the balloon, which will be used either as a stationary or movable target for the purpose of giving machine gunners practice from aeroplanes. The balloon will be towed by a motor vehicle.

Naval Flight from San Diego to Panama

Eighteen seaplanes of the F-5L type and two of the noted NC's, Nos. 5 and 6, are to take part in a 3,600-mile flight from San Diego, Cal., to Panama, beginning about January 1, 1921. The plans for the voyage specify that twelve of the F-5L design ships will be supplied by the Pacific Fleet detachment and six by the station at San Diego. The crews have not yet been selected. Air officials of the San Diego station are quoted as saying that the flight, the course of which will be down the Mexican and Central American coasts to the Isthmus, will probably be made in about sixty hours.

FOREIGN NEWS

Paris-Brussels—Paris-Geneva

Two new aerial lines have been inaugurated lately at the aerodrome of Bourget, near Paris. One morning, at 9 a.m., before Colonel Saconney, Manager of Aerial Navy Department, and Captain d'Harcourt, representing Monsieur P. E. Flandin, the Swiss airman, Durafour, left for Geneva, having on board Monsieur Dubouchez, editor of the Journal de Geneve.

In the afternoon the airman Tor, on a "Goliath" left for Brussels. Their will be a daily service with starting from Bourget and Brussels, and it is probable that a mail service will be run by the compagnie des Messageries Aeriennes.

Berlin to Have Aerial Mail

Berlin.—A contract for carrying mails by aeroplanes from incoming steamers to Berlin has been closed with the German Lloyd Air Line by the Ministry of Posts. The first flight took place recently when the steamer Susquehanna arrived at Bremen.

Plan First International Aero Exhibition in Prague

The Czechoslovak Aero Club is arranging for the first International Aero Exhibition to be held in Prague from October 23 to November 2 of this year, under the protectorate of the President of the Czechoslovak Republic, F. G. Masaryk. This exhibition is expected to be of great interest in view of the importance which is attached to the future development of aviation in Central Europe. Prague, the proposed junction of all the projected principal aerial lines of Europe, will no doubt become the centre of European aerial activities.

Many aeronautical firms of neighboring countries show considerable interest in the affair and have already promised to participate.

Regulate Aerobatics in Switzerland

L'Office Aérien issued the following instructions on the subject of "stunt" flying in Switzerland:

No acrobatic performance is allowed without special authority.

This authority is granted only to pilots who possess an efficiency certificate and to pilots whose machines possess an airworthy certificate in which the ability to stunt is set down.

Organizers who wish to include aerobatics on their programme should in each case make an application to *L'Office Aérien Fédéral.* These authorizations are subject to a tax of 200 f.

Authorized flights are subject to the following rules: (a) The occupants of the aeroplane must be provided with a parachute of a type sanctioned by *L'Office Aérien;* (b) the load must not be in excess of that specified for stunting in the airworthiness certificate; (c) all stunting below 500 metres is strictly forbidden; (d) pilots must not perform over populated or built-over districts, whether land or water; (e) during a meeting the enclosure over which stunting is to take place will be closed to spectators.

Aeroplanes used for aerobatics must not be used for passenger work on ordinary aerial lines.

Photo courtesy Captain H. S. Broad

F. Courtney, chief pilot of the Airco, looping a Boulton-Paul type biplane, equiped with two A. B. C. 320 H.P. radial motors

The Work of l'Ecole Aéro in Switzerland

L'Ecole Aéro was running meetings in August at Montana, Echallens and Thierrens; the Montana ground is 4,000 feet above sea level. The school has three two-seaters in use. Besides the Avro there are two planes entirely designed and built at Lausanne by the chief mechanic, M. Wullschleger. One, the Aéro 22, Fiat 100 h.p., is dual-control, but too heavy to be pleasant. The other, Aéro 21, is a light one-bay biplane, 80 Le Rhône, "X" form interplane struts, which gets off and lands like an elevator, requiring only about 25 yards room.

A Network of Air Services in Europe

An air service between London and Copenhagen, running three times weekly, commenced on August 8. There is also a daily service between Copenhagen and Berlin. The service from London to Copenhagn is via Amsterdam and Hamburg, and the whole service is connected up with Stockholm, Christiania and Berlin.

Flying Popular in Iceland

Even in Iceland there is talk of starting aerial services, and seemingly with every prospect of success. For some time a company, of which Mr. Franck Friedrickson, who served in the R. F. C., is a leading spirit, has been giving exhibitions at Reykjavik, and more than 70 passengers were taken up during the month of July. It is proposed to give exhibitions in the chief towns, and then later on to start regular services between the towns.

The Paris-Cabourg Aerial Service

The annual aerial service run by the Compagnie des Messageries Aèriennes between Paris and Cabourg during the Deauville season ran this year from July 15th until August 30th.

Aero Club of France Meeting at Buc

For their meeting which is to be held at the Buc aerodrome on October 1, 2 and 3, the Aero Club of France has been promised the cooperation of the French Army and Navy flying services and the various branches of the aircraft industry in France. It is hoped that one of the attractions will be a Zeppelin, the L-120, if she is delivered in time.

The Esnault-Pelterie Claim in France

M. Robert Esnault-Pelterie, the famous French pioneer of aviation, has brought an action in the French courts to recover damages from practically all aeroplane constructors for infringement of his patent, taken out in 1907, for the device of a lever operating mechanism for maintaining at the same time the longitudinal and lateral stability of an aeroplane. He started these proceedings some time before the war, but they were held up by it. The sum of 2,000 francs is claimed for each machine in which a lever for stabilizing controls is used, and the total amount involved is said to be somewhere about 55,000,000 francs.

The inventor has secured an injunction prohibiting payment of the sums owed by the French Government to the various aeroplane constructors, among whom are English as well as French firms, until the question of the damages has been decided. It is said that if the inventor succeeds in establishing his claims in full most of the constructors will have to close down.

New German Aerial Mail Routes

A daily aerial mail service was instituted on July 4 between Hamburg and Westerland and another on July 15 between Berlin and Swinemünde. The journeys between the first-named places take two hours and between Berlin and Swinemünde one and a half hours. In addition to the ordinary charge, postcards and letters up to 20 grammes are taxed 20 pfennigs, and letters and parcels from 50 to 100 grammes 1.60 marks; over 500 grammes and under a kilogram the charge is 9.60 marks, with an additional 10 marks for every additional kilogram.

The Paris-Geneva Service

For their service between Paris and Geneva, the French Aero Transport Company propose to use Sopwith three-seater machines, fitted with 130 h.p. Clerget engines. The charge will work out to about £20 for the single journey; return tickets, available for a fortnight, £30. The journey over the distance of 280 miles is estimated to take three and a half hours.

The French Government Competition

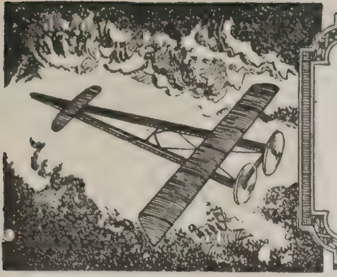
The French Government competition for aeroplanes, organized and controlled by the Service Technique de l'Aèronautique, is to be held early in 1921. All aeroplanes entered for the contest must be at Villacoublay by December 31st next. The competition for aero engines begins on August 15th next. Both these contests were originally arranged by General de Brigade Duval when he was Director-General of Military Aeronautics.

The following machines have been entered for the aeroplane competition: (1) Blêriot triplane Mammoth, four Hispano-Suiza engines, weight fully loaded 7,000 kilos; (2) Latécoère biplane, three engines (one 500-h.p. Salmson and two 200-h.p. Salmsons), weight fully loaded 6,500 kilos; (3) Farman biplane Goliath, modified, three 200-h.p. Salmsons, weight fully loaded 5,281 kilos: (4) Caudron C-25 biplane, three 200-h.p. Salmsons, weight fully loaded 5,320 kilos. All these machines are, or will be, ready in time for the contest. A fifth machine, the Breguet with four Bugatti engines totalling 810 h.p., may not be ready in time. The weight fully loaded will be 6,320 kilos.

After elimination examinations the aeroplanes entered will fly over a course of which the following are the stages which must be covered without intermediate descents and at any speed and height: Villacoublay-Lyon-Tours-Metz-Chateauroux-Saint Inglevert-Dijon-Istres-Bordeaux-Villacoublay. The total distance to be covered is 4,500 kolometres (2,794 miles). The days on which the flights are made may be chosen by the entrants.

The following entries have been received in the engine competition: (1) Renault, a 350-h.p. engine derived from the 450-h.p. Renault and fitted with reduction gear; (2) Schneider, a 350-h.p. engine derived from the 370-h.p. Lorraine; (3) Farman, three types of engines fitted to the Goliath; (4) Breguet, a modified Bugatti; and (5) Salmson, a 300-h.p. engine.

The credits for these trials were included in the Extraordinary Budget of 1920.



ELEMENTARY AERONAUTICS *and* MODEL NOTES

By John F. McMahon

CLUBS

PACIFIC NORTHWEST MODEL AERO CLUB
921 Ravenna Boulevard, Seattle, Wash.
BAY RIDGE MODEL CLUB
8730 Ridge Boulevard, Bay Ridge, Brooklyn
INDIANA UNIVERSITY AERO SCIENCE CLUB
Bloomington, Indiana
BROADWAY MODEL AERO CLUB
931 North Broadway, Baltimore, Md.
TRIANGLE MODEL AERO CLUB
Baltimore, Md.

NEBRASKA MODEL AERO CLUB
Lincoln, Nebraska
BUFFALO AERO SCIENCE CLUB
c/o Christian Weyand, 48 Dodge St., Buffalo, N. Y.
THE ILLINOIS MODEL AERO CLUB
Room 130, Auditorium Hotel, Chicago, Ill.
SCOUT MODEL AERO CLUB
304 Chamber of Commerce Bldg., Indianapolis, Indiana
MILWAUKEE MODEL AERO CLUB
455 Murray Ave., Milwaukee, Wis.

CONCORD MODEL AERO CLUB
c/o Edward P. Warner, Concord, Mass.
MODEL AERO CLUB OF OXFORD
Oxford, Pa.
CAPITOL MODEL AERO CLUB
1726 M Street, N. W.
Washington, D. C.
AERO SCIENCE CLUB OF AMERICA
Beach Bldg., E. 23rd St.,
N. Y. City
AERO CLUB OF LANE TECHNICAL HIGH SCHOOL
Sedgwick & Division Streets, Chicago, Ill.

The Formation of a Model Aeroplane Club

MANY readers of AERIAL AGE write to me asking how to form a model aeroplane club and how to conduct one to the interest of the members.

The answer to the above might be of interest to other readers as well.

If any young man is interested in aeroplanes to such a degree that he feels he cannot learn more or conduct experiments as well as he might should he have company, he should at once look around for another, with as much interest as himself and induce that person to join forces with him in his experiments.

It becomes easy then to go out some fine day to a nearby field where there are no trees to interfere with a model aeroplane in flight and send the models up to the delight and astonishment of lookers on. If the young man should not know of another person interested in model aeroplanes he could go to the field alone and in less than an hour there would be enough young men interested to join forces with him and a club is formed.

Now when the club is started (the meeting place can be arranged for at some member's home, in the school, public library, church, hall or any place where a lecture can be given), the first thing to do is to draw up a constitution and by-laws to govern the proceedings of the club. The by-laws, etc., can be copied after one in use by some other club and need not be taken from an aeroplane club. Of course the wording would have to be changed here and there to agree with the aeronautic atmosphere. Officers must be elected and some little dues charged by which aeronautic textbooks can be purchased for use of the members.

The members should subscribe to AERIAL AGE and the articles contained therein studied and improvements in aeroplane design from time to time noted.

At least once a week one of the members who is better able to describe his successes should give a short lecture or instruction to the other members.

Once in a while some aeronautic authority should be invited to one of the meetings to give pointers on aeroplane design.

Model aeroplanes alone should not be discussed but the larger machines as well. It is not well to keep at models forever as they are soon outgrown and the big machine becomes the main attraction, but by studying the model and big machine together many points of interest are brought out.

Competition is another good thing and contests for distance, duration, direction in both water and land models as well as for construction, design and new ideas in scale models should be held and prizes awarded.

Open competition to other than members is always a good way to gain more members or at least friends.

Regarding Light Type Machines

The light type aeroplane has taken a grip on many aeroplane followers in this country and Europe with the result that the larger companies have started to market them.

This is good news to me as I have advocated the light type aeroplane for the past four years, but right here I wish to caution the readers of AERIAL AGE in the abuse of the knowledge given. By this I mean that more harm than good can be done by a reader following an article on this subject and then trying to go one better and fly with a one-cylinder motor cycle engine where I have specified a twin cylinder of greater horsepower.

This generally ends up with the builder writing to me asking reasons why the machine would not fly or telling me it was hard to get off the ground.

When the design of a machine is given I generally allow a reserve of only two or three horsepower for safety (in the small machines) so when a reader attempts to build the machine and install a motor having but half the power, it is no wonder he gets into trouble.

The light type machine designs are given to assist the readers who cannot afford to buy a machine or to build an expensive one, and from the way these articles and drawings are received they are serving their purpose well. You will notice on this page a photo of the Italian Macchi machine which is almost an exact copy of the motorcycle-engined aeroplane that was described in the January 19th issue of AERIAL AGE. This little machine was a modification in a biplane from a monoplane designed originally and the articles on construction appeared during December, 1919, and January, 1920. The biplane was designed to fly with a 16 horsepower motor and this would be sufficient for horizontal flight at low altitudes, but the Macchi company installed a 30 horsepower Anzoni and won the contest against some of the best machines in Italy. It is always safe to install a more powerful engine, but dangerous to cut the power down.

Another point of caution is the use of a small motor for water work.

A motorcycle engine or a redesigned Ford motor should never be used for this purpose. It might be possible to get up a design that would permit an aeroplane with one of these engines to get off, but the craft would be sluggish and slow with no reserve power in case of a back slide or any of many dangers encountered.

What I wish to call to the attention of the reader is not to try to improve a design given in AERIAL AGE by cutting down horsepower, far better to increase it, and then not so much that the balance would be affected.

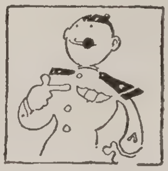
The Macchi biplane which recently won first prize at the Italian competitions for small aeroplanes. Readers will recognize how closely this machine follows the general design of the Motorcycle Engined Biplane of which drawings appeared in January 19, 1920 issue of AERIAL AGE

Aeronitis is a pleasant, a decidedly infectious ailment, which makes its victims "flighty," mentally and physically. At times it has a pathologic, at times merely a psychologic foundation. It already has affected thousands; it will get the rest of the world in time. Its symptoms vary in each case and each victim has a different story to tell. When you finish this column YOU may be infected, and may have a story all of your own. If so, your contribution will be welcomed by your fellow AERONUTS. Initials of contributor will be printed when requested.

A FLIGHT OF FANCY

By C. L. FUNNELL

Drawings by John Held, Jr.

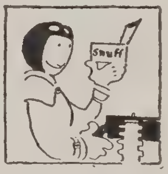


Miss Geraldine Agnes Van Feedem
  Was fair as a lady could be.
She doted on Boys-in-the-Navy—
  Some afternoon teaser was she!

When once she was teaing an Ensign
  Who wore the gold wings on his breast,
She teased for a tale of adventure—
  Of flights, sights and fights and the rest.

"One day," said her hero, obliging,
  "I was ordered aloft in my bus
To chase off a bum of a bomber,
  Who made an abomb'nable fuss.

"Now my motor was sickly and nervous,
  And coughed like a man with the con;
When I tried to take off of the water
  I only kept taxi-ing on.

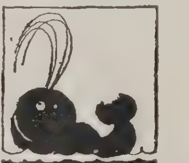


"So I pointed her nose to the ocean
  In search of a bit of a blow
That would pick the old can off the water
  And head her for Heaven, you know.

"But the weather was calm and collected;
  The air carried nary a puff.
So I took down my starboard machine gun
  And I loaded a cartridge with snuff.

"Then I spied a sperm whale in the offing.
  His eyes were both crafty and small;
He gaped his surprise when he saw me,
  His gaper wide open, withal.

"So reaching that starboard machine gun,
  I slipped the old trigger a squeeze,
And I shot the poor fish with the snuff-ball,
  And he let out a whale of a sneeze.



"The draft swung our leading edge upward
  And lifted her clear of the sea,
And we wafted aloft on the zephyrs
  As planely as plainly could be.

"Then I chased up the bloomin' Boche bomber
  And blew his machine all apart;
And he fell in the whale's open gaper
  As straight as a gravity dart.

"The whale looked surprised as he swallowed,
  Then dove where the water ran green,
And I knew the Hun bomber was transferred
  From Flying to Submarine."

Courtesy American Legion

Fell Into Fortune

"Sure, it's Mike that's the lucky man."

"How's that?"

"Why, he just took out an insurance policy for ten thousand dollars and the very next day he fell off the bridge and got drowned in the river."

New York Globe News

The most discouraging news to the presidential candidates and their stump speakers must be the crop reports showing that there are more tomatoes this year than most people know what to do with.

Lucky Bird, Blinker

Two Stripes: Didja hear that Blinker signed up for overseas service again?

Three Stripes: Zatso? How long did he sign for?

Two Stripes: For the duration of prohibition.—*American Legion Weekly.*

A New Musical Instrument

Pilot: Have you any chandeliers at your place, Mike?

Observer: Naw, nobody knows how to play 'em.

Question Colyumm

Ques.—What's the difference between a brace and a strut?

Ans.—If someone asks you for a five; that's a brace. If you got it you strut.

A Lot to Worry About

"And so you looped the loop with Lieutenant Smith," gushed her friend. "What solemn thoughts you must have had, tampering thus with the very forces of nature—defying gravity and even death itself!"

"Yes," answered the frivolous one, "I kept wondering if my hat was on straight."

He Never "Misses" Evidently

Spark: "How is your boss now?"

Plug: "He is still firing."

It Never Happened

The great masterpiece, "Gold Chevrons and Eight Chevaux," was being filmed. The scene where the hero returns from France in a blinding storm was progressing rapidly when the director leaped into the scene with upraised hand.

"Stop!" he roared. "This is no fairy tale. The hero is a soldier and you've got him wearing a raincoat that fits."

—*The Red Diamond.*

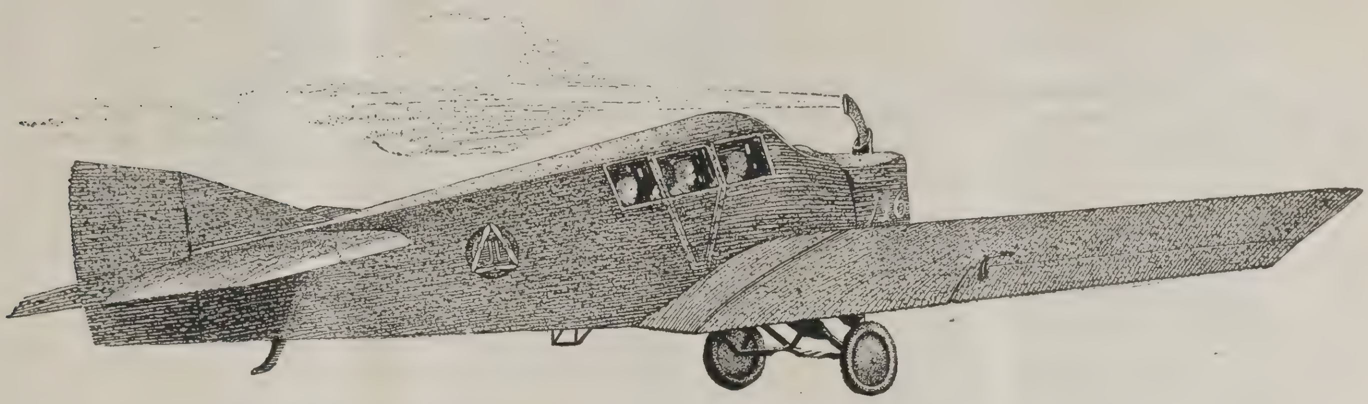
It All Depends

Two aviators were spending a holiday at the seashore. "Say, Tom," asked one, "how do you teach a girl to swim?"

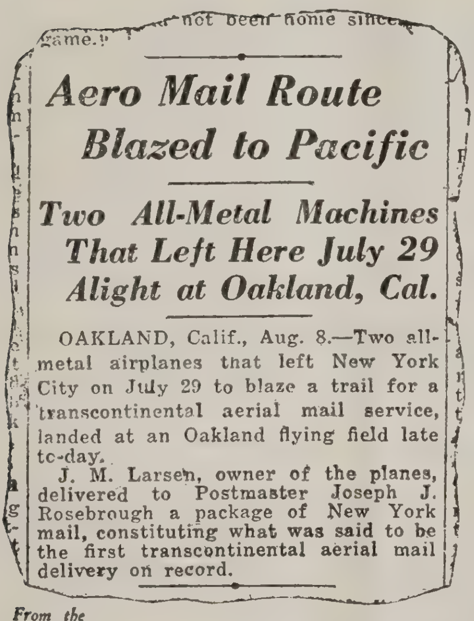
"That's easy," replied Tom. "You take her gently down to the water; then you put your arm around her waist and whisper, 'Darlin', don't be frightened.'"

"Oh, come off!" returned Dick. "She's only me sister."

"Oh, your sister! Well, if that's the case, just push her in."



Valspar is the Official Varnish for All-Metal 'Planes



not been home since

game.

Aero Mail Route Blazed to Pacific

Two All-Metal Machines That Left Here July 29 Alight at Oakland, Cal.

OAKLAND, Calif., Aug. 8.—Two all-metal airplanes that left New York City on July 29 to blaze a trail for a transcontinental aerial mail service, landed at an Oakland flying field late to-day.

J. M. Larsen, owner of the planes, delivered to Postmaster Joseph J. Rosebrough a package of New York mail, constituting what was said to be the first transcontinental aerial mail delivery on record.

From the New York Tribune

The notable achievements of J. L. All-Metal Monoplanes have been attracting the attention of the flying world.

Being designed to travel at high altitudes and high speed, only 100% efficient materials, tested to the *n*th degree, can be used in their construction.

In common with the other leading airplane manufacturers, the J. L. Aircraft Corporation knows that Valspar best meets the exacting requirements of air navigation.

Therefore this corporation has adopted Valspar as its standard finish, and these record-breaking All-Metal 'Planes are

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Each machine built to the same specifications as required by War Office, London, and subject during construction and on trial to rigid inspection and exacting tests.

Workmanship unequalled. Equipped with Rolls Royce engines or choice of other high grade motors.

Flying speed 130 miles per hour. Tank capacity 700 miles. Climbs 10,000 feet in 15 minutes. Ceiling 18,000 feet with full load. Useful load over one ton. Landing speed 40 miles per hour.

As a business proposition this Seven Passenger Plane should return the operator the whole investment every month.

Machines manufactured in Great Britain: thoroughly tested before shipping to this country.

To introduce this line a limited number are available at manufacturer's cost—immediate delivery.

Write for specifications and full particulars of this and other standard types of planes.

Amerada Engineering Corporation *Suite 535, 30 Church Street* New York

(*Continued from page* 867)

1910.	Claude Graham White	England	Mr. White used a Bleriot monoplane, attaining a speed of 63 m.p.h.
1911.	C. T. Weymann	America	Mr. Weymann used a Nieuport monoplane, attaining a speed of 80 m.p.h.
1912.	Jules Vedrines	France	Mr. Vedrines used a Deperdussin monoplane, attaining a speed of 105 m.p.h
1913.	Maurice Provost	France	Mr. Provost used a Deperdussin monoplane, attaining a speed of 126.59 m.p.h.

Subsequent contests not held on account of the war. The permanent trophy goes to the country winning the race three times in succession.

Roland Rohlfs

Roland Rohlfs, the expert pilot who will fly the Cox machine in the Gordon Bennett races, is one of the best-known fliers in the world. Although his experience covers a period of only four years, he has crowded into it more achievements than any other flier. He came into public prominence by testing the Curtiss Wasp in its speed trials at McCook Field in 1918 when that machine made a record of 162 miles per hour with full military equipment. His crowning achievement came, however, when he piloted the same machine on its record-breaking ascent in September of last year. 32,450 feet was the altitude record he hung up, considerably higher than any other man had ever soared in an aeroplane, a record which was broken by Major Schroeder a few months later.

Mrs. S. E. J. Cox

Mrs. S. E. J. Cox, who christened the Gordon Bennett racer, attained considerable prominence a year ago by dropping into New York after a trip from Houston, Texas, via the air. Along with her came her nine-year-old son who was to enter the Raymond Riordan School at Highland, N. Y. It was the longest flight that had ever been made by a woman. She also made the flight back to Texas, the round trip covering approximately 5,000 miles. In Texas, her home, she makes most of her trips by air. She was the first woman in the United States to purchase an aeroplane for her own use, her first plane being a Curtiss JN-4D. Later she purchased a Curtiss Oriole which she used on her trip from Texas, and which she is now using. Mr. Cox has found the aeroplane so satisfactory in making trips to his various oil properties that he has a complete aeroplane transportation system, consisting of Curtiss machines, a private flying field, hangars, and a corps of aviators and mechanics.

Clarence Coombs

Clarence Coombs, the second flier of the Gordon Bennett racer, was brought into public notice by his successful work in France and later at McCook Field where he earned the high distinction of being one of the few non-commissioned men to win his wings. He was a test pilot at McCook Field, doing considerable experimental work in speed landings of DeHavilands. He was also prominent in several cross-country races held last year, finishing second in the New York-Toronto speed contest. Of late he has been employed as test pilot for the Ordnance Engineering Corporation and his latest achievement is the establishment of a new world's record in altitude for pilot and three passengers. He is regarded in army aviation circles as being one of the most expert fliers in the service.

History of the Gordon Bennett Racer

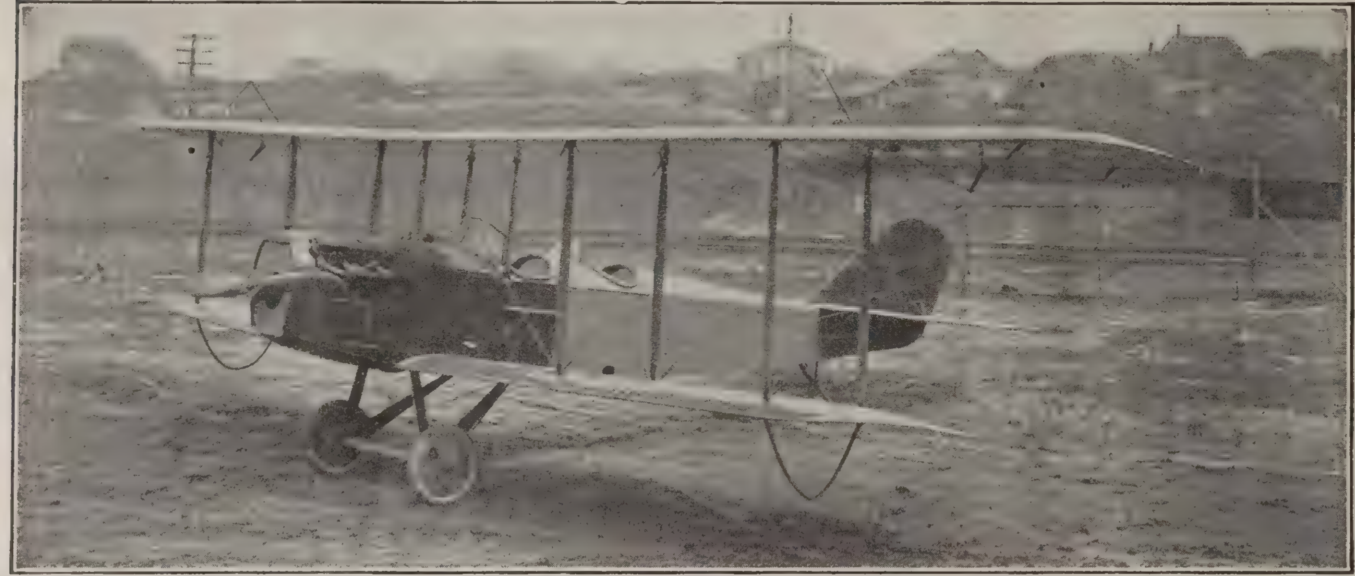
The history of the origin and development of the Cox entry for the Gordon Bennett trophy is one of the most interesting in the annals of aviation.

In the summer of 1919, the Aero Club of Texas, upon investigation, found that up to that time no tangible plans had been made to have America represented in the world's premier aeronautical racing event to be held in France in September, 1920. Lacking the necessary funds with which to finance upon such a project, the club made an appeal to S. E. J. Cox of Houston, Texas, a wealthy oil operator, who had, practically by his individual efforts, sponsored commercial aviation in the southwest.

When informed that unless someone took hold the race would be held without representation by America, Mr. Cox was amazed.

"How much will it cost?" he asked. Informed that it

(*Continued on page* 883)



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Another style for desk ornament	6.00
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Enameled sterling silver AERO safety pins	2.00
Enameled sterling silver AERO scarf pins	.50 to 1.00
Enameled sterling silver AERO lapel pins	.50 to 1.00
(All jewelry is of the best workmanship, having an aeroplane beautifully designed in silver.)	
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(*Continued from page* 881)

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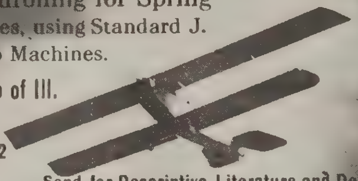

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INDEX TO AERIAL AGE

VOLUME XI

PAGE

A

- Accelerometer, Notes on the Theory of the, by E. P. Warner 681
- Aces Became Chevaliers 149
- Activities of Army Balloon School, Fort Omaha 261
- Adams, C. W., On Exhibition Tour 576
- Addresses, Wright Memorial Address by Commander Hunsaker 576
- Adirondacks Resorts, Aeroplanes for 506
- Advisory Committee in France 160
- Aerial League of America:
  - Offers 1,000 "Aviette" Challenge Trophy to Popularize New Sport 325
  - Celebrates Fourth Anniversary of Organization of Aerial Coast Patrol, No. 1 609
- Aerial League of the World, Organized 797
- Aerial Mail:
  - Aerial Mails in France 748
  - Aerial Mail to Obtain Army Planes 215
  - Aerial Mail to Use Caproni Planes 400
  - Aerial Mail Will Get Appropriations If "Pernicious Lobbying" is Stopped 48
  - Aerial Post Between Italy and Greece 24
  - Authorize Aerial Mail Service from Los Angeles to San Francisco 544
  - Berlin to Have 876
  - China Contemplates Establishment of an Aerial Mail Service 507
  - China to Have 586
  - China to Start Lines for, 516
  - Commences Aerial Mail in Spain 262
  - Commemorates Overseas Aerial Mail 620
  - Contract Given for Key West–Havana Aerial Mail 865
  - Daily Dispatch of Mails by Aeroplane Between London and Amsterdam 716
  - Efficiency Rating of 803
  - Establish Permanent Aero Service in India 748
  - Experiments in New Zealand 627
  - First Aerial Mail Between Seattle and Yakima 768
  - First Aerial Mail in Idaho 544
  - Germany Resuscitates Aerial Mail 748
  - In Algiers 652
  - In China 780
  - Italian Aerial Mail Service During Strike 52
  - Italian–Grecian Air Mail 92
  - Italy Sends Mail to Offset Telegraph Strike 262
  - January, 1920, Report 52
  - London–Brussels Postal Service Started 748
  - Mail Plane at 16,000 Feet Breaks Record for Trip 544
  - New German Aerial Mail Routes 876
  - New Zealand Aerial Mail Service 92
  - Omaha Aerial Mail Makes Fast Start 400
  - 1,250,000 for, 149
  - 157 Miles An Hour 150
  - Operated Successfully Two Years 361
  - Performance Record 803
  - Plan New York–San Francisco Aerial Mail Service 739
  - Plan Seattle–Victoria, B. C., Aerial Mail Service 739
  - Plan Start of Transcontinental Aerial Mail 835
  - Plan Transfer of Oriental Mail by Aeroplane from Victoria to U. S. 870
  - Post Office Department to Award Aerial Mail Carrying Contracts 430
  - Propose Blimp Transcontinental Mail Service 801
  - Propose Service for Seattle, Wash. 610
  - Post Office Department Issues Call for Proposals for 644
  - Radio Warns Mail Plane 610
  - Reliability of 116
  - Reno Council Accepts Bids for Hangar to be Used in Transcontinental Aerial Mail Service 801
  - Rome–Athens Aerial Mail 92
  - Service in Belgium Congo 194
  - Service Regular in Italy 92
  - Services in French Indo–China 552
  - Service Between Paris, Prague and Warsaw 844
  - Service Between London and Brussels 812
  - Service between Western Cities 835
  - St. Louis–Chicago Aerial Mail Trip Made in Less Than Four Hours 834
  - South African Aerial Mail 586
  - Squadron Mail Delivered by Aeroplane 52
  - Swedish–Finnish Aerial Mail 92
  - To Abandon Heller Field 544
  - To Guide Aerial Mail Pilots with Searchlights 322
  - To Rate Divisions 218
  - Toulouse–Rabat Aerial Mail Service Has Extended Its Line to Casablanca 812
  - Two Aerial Mail Services During French Strike 52
  - United States Post Office Department Charts, 184, 218, 252, 322, 400, 544, 739, 803 835
  - Want Aerial Mail to Latin America 218
- Aerial Merchant Marine, United States to Lead in 395
- Aerial Service Corporation, Started Operations at Hammondsport 646
- Aerial Stations:
  - Lighter-Than-Air Craft Station Opened at Akron 249
  - Pass Bill for New York City to Give Land for 249
- Aerobatics, Regulated in Switzerland 876
- Aero Club of America:
  - Announces Entries for Balloon Race 609
  - Courts Asked for Injunction to Help Aero Club Maintain Its National Leadership 671
  - Evidence of Conspiracy to Destroy Club Submitted to Supreme Court of New York by Mr. Woodhouse, 703, 798 830
  - Members Form Committee to Fight Schemers' Ruse to Get Control of Club 733
  - Name Entries for International Air Race 641
  - National Movement to Popularize Aeronautics to be Launched by 179
  - Purposes of Irregular Meeting of Club Called for August 16th Violate New York State Laws 765
  - Special Meeting of Club to be Held August 28th 810
  - "Uphold the Law, Foster Aeronautic Activities," Keynote of Meeting of 863
- Aero Clubs:
  - Aero Club of Buffalo Holds Annual Outing 865
  - Aero Club of Canada Asked to Assist in Delivering Bees by Air 586
  - Aero Club of Catalonia to Hold Hydro-Aeroplane Meeting 334
  - Aero Club of Chattanooga Doing Excellent Work 472
  - Aero Club of Cincinnati, Very Active 81
  - Aero Club of Cincinnati Holds Banquet 737
  - Aero Club of Detroit Purchases Land for Aviation Field 674
  - Aero Club of Duluth Organized 11
  - Aero Club of Evansville Planning a Club House 676
  - Aero Club of Evansville Promoting Aviation 706
  - Aero Club of France, Homologated Speed, Duration and Distance Records of Farman Goliath, Piloted by L. Boussoutrot and J. Bernard 684
  - Aero Club of France Has Awarded Leon-Morane Challenge Trophy to Jean Casale 684
  - Aero Club of France Has Been Offered Sum by M. Louis Bleriot for Safety Prize 480
  - Aero Club of France Has Meeting at Buc 876
  - Aero Club of France, New President of 126
  - Aero Club of Italy Arranges Aircraft Exposition 374
  - Aero Club of Ithaca, Exhibitions, Rules and Regulations of 161
  - Aero Club of Louisiana, A Club Planned at Houma by, 675
  - Aero Club of Mansfield Organized 360
  - Aero Club of North Carolina College Formed 81
  - Pacific Aero Club's Quarters are Popular 866
  - Aero Club of Pennsylvania Holds Field Day 576
  - Aero Club of Pensacola, Campaign Started to Organize 249
  - Aero Club of Pittsburgh is Addressed by Major Chas. J. Glidden 641
  - Sixty Aero Clubs to Send Delegates to Atlantic City 180
  - Aero Club of Southern California, K. M. Turner Elected President of, 432, 472
  - Aero Club of Southern California Plans Air Terminal 641
  - Aero Club of Syracuse Taken Over by Syracuse Aero Corporation 399
  - Aero Club of Vermont Holds Joint Meeting 49
  - Model Aero Clubs, Formation of, by John F. McMahon 877
  - Model Aero Club of Illinois, Club News 297
  - Model Aero Club of Illinois, News Bulletin 813
  - Model Aero Club of Illinois, Indoor Contests of, 813
  - Model Aero Club of Ithaca, Exhibition of, 375
  - Model Aero Club of Pittsburgh, Organized 443
- Aerodromes:
  - British Air Ministry Announces Hounslow Aerodrome Open to Night Flyers 24
  - British Aviators to Receive Assistance on Italian Aerodromes 262
  - Canada Has Two More 716
  - Establish New Dutch Aerodromes 194
  - Government Seeks Buyer for 321
  - In Bechuanaland 408
  - International Aerodrome in Berlin 480
  - List of Aerodromes Issued by British Air Ministry 442
  - Mexican Government Establishes Aerodrome at Piedras Negras 24
  - New Official Aerodrome at Lausanne 262
  - Opening of Aerodrome at Bidston 262
- Aerodynamics Chair at the Imperial College 408
- Aero Limited:
  - Carried 407 Passengers in June 641
  - Carried 700 Passengers in July 770
  - Two HS 2L Machines Used to Carry Grapefruit 675
- Aerological, Complete Set of Equipment for Pearl Harbor 779
- Aerological Service at Panama Canal 706
- Aeronautics:
  - Massachusetts Creates Aeronautic Board 577
  - National Movement to Popularize Aeronautics to be Launched by Aero Club of America 179
  - Spain Shows Progressive Attitude Toward 320
  - To be Studied at Culver Military Academy 674
- Aeronitis:
  - Pages 26, 62, 94, 128, 162, 196, 230, 264, 298, 336, 376, 410, 444, 482, 518, 554, 588, 622, 654, 686, 718, 750, 782, 814, 846, 878
- Aeroplanes:
  - Absolutely Fireproof 359
  - British Aeroplanes for South America 60
  - Enemy Aeroplanes Sent to United States 81
  - How the "Surplus" Aeroplanes Spectre is Being Put to Work to Produce Permanent Business for Aeronautic Industry 147
  - Large Demand for 539
  - Multi-plane Being Assembled at Langley Field for Test 398
  - Salvaged Aeroplanes Stored at Love Field 373
  - Smaller and Cheaper Aeroplanes 92
  - Smallest Triplane 480
  - Why Aeroplanes Are Necessary 577
- Aeroplanes (Types):
  - Ace, Plane Exhibited in New York 181
  - Ace, Horace Keane and Sister Doris, in an, (photo) 150
  - Alerian, French Plane (photo) 249
  - Airco, London–Paris Aerial Express (photo) 159
  - Ansaldo Machines to be Made in Five Factories 296
  - Armstrong–Whitworth, Experimental Plane (photo) 611
  - Avion, Used in Service Between Los Angeles and San Francisco 676
  - Avro:
    - Demonstrating the Maneuverability of, at Mitchel Field (photo) May 10th Cover.
    - Flies from New York to Minneapolis in 16½ Hours 770
    - Makes Good Cross Country Trip 738
    - Planes Arrive in San Francisco for Show 217
    - Planes to be Exhibited in Atlantic City (photo) 181
    - Training Chinese Pilots in, 228
    - Trials Satisfactory 126
    - Type 547 (Illus. art) 152
    - With 35 H.P. Green Engine (photo) 115
  - Avro "Baby," Equipped with 36 H.P. Motor (photo) 480
  - Avro "Baby," Sport Plane (Illus. art) 709
  - Bellanca, Flies from Mitchel Field to Glens Falls, N. Y., 220 Miles, in 2 Hours, 5 Minutes 643
  - Bellanca, Biplane (Illus. art) 113
  - Blackburn "Kangaroo" (photo) 779
  - Boeing:
    - Plane in which H. Munter and Two Passengers Flew Over Cascade Mountains in State of Washington (photo) 643
    - Plane Crosses Cascade Mountains in Flight from Seattle, Wash., to Portland, Ore. 811
  - Boulton & Paul:
    - Biplane (photo) 876
    - Commercial Machine with two 450 H. P. Napier Lion Engines (Illus. art) 290
  - Brequet Plane Fitted with Liberty Motor 333
  - Bristol:
    - Aeroplane for Nicaragua 296
    - Aeroplane Presented to King Albert of Belgium (photo) 868
    - Babe, Monoplane, Badger, Fighter, Tourer and the Four-Engined Pullman (photo) 369
    - Exhibit Plane Sold 49
    - Formation of Bristol Fighters, June 28th Cover
    - King of Belgium Presented With 480
    - Lt. Cortinez In Bristol Monoplane at Santiago, Chile, Starting on Flight Over Andes (photo) 358
    - "Pullman" Well Adapted for Aerial Travel 321
    - Tests "Pullman" 194
  - Caproni;
    - Biplane Model 194
    - On Way to Tokio 24
    - Plans New York to Paris Flight in 36 Hours 641

PAGE

Caudron Five Engine Plane Flies 124 Miles Per Hour 516
Central Aircraft Types (Illus. art) 20
  Nine-Seater Plane (photo) 59
"Cootie" Monoplane (Illus. art) 251
Curtiss:
  Aeroplanes Arrive in Hong Kong.... 217
  First Carload of Machines to Reach Spokane, Wash. 115
Curtiss Aero Ltd. No. 6, Mae Murray Christens Machine 286
Curtiss Eagle, Insured 360
Curtiss Flying Boat:
  Twin-Engined, Property of American Trans-Oceanic Co., at Miami (photo) 50
  Type F Flies from St. Petersburg, Fla., to Springfield, Mass.... 505
Curtiss JN–4D, Used for Farm Commuting 183
Curtiss JN-40 Purchased by Aurora Aviation Co., for Aerial Service.... 507
Curtiss Oriole, Airscape of Polo Grounds, N. Y., taken from June 14 Cover
Curtiss Oriole Shown at Automobile Show, Madison, Wis. 543
Curtiss Oriole, Two-passenger and Pilot Machine (photo) 11
Curtiss Oriole Used to Inspect Power Lines 542
Curtiss Oriole Used by Simmons Hardware Co. to Advertise "Keen Kutter" Products (photo) 151
Curtiss Scooter, photo of 81
Curtiss Seagull, photo of 12
Curtiss Standard, Symons–Russell Aviation Co. Have Received Two Carloads of New, ... 473
Curtiss Standard J-1 Has Successful Commercial Flight 399
Curtiss "Texas Wildcat," Christening of (photo) 736, 867
Curtiss "Wasp":
  First Machine to Fly in Bolivia 399
  Seaplane Which Established a New Navy Speed Record of 138 Miles Per Hour 431
Dayton Wright, Aerial Coupe (photo).. 506
Dayton Wright Limousine (photo) 12
De Haviland:
  Climb of Service Type Tested at Langley 333
  Equipped with Machine Guns, Soon Be Sent to Mexican Border for [illegible] 215
  Plane from which Lt. J. H. Wilson Dropped 19,[illegible]00 Feet in Parachute (photo) 551
D H 4 Remodeled as Ambulance Plane at Kelly Field 407
D H 4B, Test Proves Satisfactory.... 125
D H 4B, Parachute Plane Painted White 295
D H 4B, Four Aeroplanes in Flight from N. Y.–Alaska Reach Erie, Pa. 683
D H 4B, New Landing Gear Struts.... 193
D H 9, England Has Handed Over to Australia 28 Machines by Way of Reciprocating Former Gift 652
D H 9, Exhibited at Atlantic City (photo) 368
D D 9, Makes Fast Non-Stop Cross Country Flight 333
De Marcay (Illus. art) 869
De Pischoff, New Sport Plane in France 194
Farman:
  "Goliath" Used in the Paris–London Passenger Service (photo) 321
  Planes Carry Mail During French Rail Strike 322
  Two-Passenger Sport Plane Wins Grand Prize 708
  Type GL41, Wins Grand Prize of Monaco 516
  Type F50, Schneebeti Silencer Fitted to Lorraine Engine 228
  Type F70 Equipped with 260 H.P. Salmson Motor (photo) 473
Tourabout:
  Louis Gaubert Makes Aerial Tour in (Illus. art) 320
  Mr. and Mrs. Louis Goubert and Daughter in, ... 508
  Plane Busy at Charlotte, N. C. 674
  Harrison R. Tucker Makes Record Flight with 575
Fiat, 12-Passenger Plane (Illus. art).. 185
Fokker:
  Experiments Show Non-Inflammable Fabric Used 183
  Latest Creation is Six-Passenger Monoplane Limousine 516
  Tests of Chassis.... 627
Gallaudet C3 Liberty Tourine Plane, (Illus. art) 771
  Cross Country Flight Begun in 800
Graham-White Five-Paassenger Aero Limousine 610
Handley-Page:
  Advertisements Painted on Planes .. 408
  Aerial Advertising in South Africa and India 480
  "Daily Express" in 10,000 ,mile Indian Flight 552
  Flight Made by Aeroplane with New Wing 552

PAGE

  In China 228, 408
  In Scandinavia 126
  Plane Rises 13,999 Feet with 3,690 Pounds on Board 408, 480
  Special Type Freighters Being Constructed 516
  Twin-Engined Biplane Exhibited at Atlantic City (photo) 401
Hurst:
  Model H-2 Curtiss Motored Biplane (photo) 217
Larsen:
  Army Gets J.L. All-Metal Aeroplane 609
  Army Officers Strongly Endorse J.L.6 551
  Demonstrate J.L. All-Metal Aeroplanes to Army.... 515
  J.L.6. Monoplane Delivers Yacht Race Photos 706
  J.L.6 Completes Trans-continental Round Trip 832
  J.L.6 Makes 1,200-Mile Non-Stop Flight 575
  J.L.6 Monoplane Creates Great Interest at Atlantic City (photo).... 471
  J.L.6 Monoplanes Reach Omaha on Trans-continental Trip 736
  J.L. All-Metal Plane Flies from New York to Omaha with Wedding Cake 576
  Mercury Aviation Co. to Use J.L. Monoplanes 802
  New Six-Passenger Record Made by Larsen All-Metal Monoplane 431
  Personnel of Three J.L. Monoplanes Which Left Central Park Field, L. I. (photo) 737
  Three of J.L.6 Metal Monoplanes Created Interest in Army (photo).. 542
  Two of the Three Planes Reach Pacific Coast 768
Letord:
  Biplane (photo) 408
  Type LI (photo) 585
Lincoln Standard:
  Flies from Denver to Salt Lake City 738
  Purchased by U. S. Aircraft Corp... 360
  Speedster (Illus. art) 740
Loughead, Sport Biplane (Illus. art) .. 434
L.W.F. Bombing Plane Christened .. 433
Macchi, Biplane (photo) 877
Martinsyde:
  New Speed Record of 161 Miles Per Hour 652
  Single Seater and "A" (Illus. art) 22
Morane–Saulnier:
  Planes to be Built in United States 868
  Two-Seater Fighter Equipped with 400 H.P. Liberty Engine (photo) 715
Norman–Thompson:
  Exhibited at Atlantic City (photo)... 369
Orenco:
  Commercial and Military Types (Illus-art) 84
  Four-Seater Climbs 16,200 Feet 319
  To Expand 360
  Test Tourist Plane 114
  Tourister "F" (Illus. art) 253
Pacific Hawk, (Illus. art) 577, 578
Passe Partout (photo) 970
Pioneer, Single Seater Sport Plane (Illus. art) 285, 370
Potez:
  Biplane Makes Good Flight 586
  Types SEA IV-C2, LV PM, VIII (Illus. art) 645
Salmson (photo) 149
Sopwith:
  Camel, Capt. H. S. Broad Climbing in, (photo) ....April 12th Cover
  Commercial and Sporting Types 219
  Dove, with 80 H.P. Le Rhone Engine (Illus. art) 220
  Gnu, Three-Seater with BR2 Engine, (Illus. art) 219
  Grasshopper, with 100 H.P. Anzani Engine (Illus. art) 220
  Triplane Model (Illus. art) 229
  Wallaby, with 375 Rolls-Royce Engine (Illus. art) 219
Stinson, "Greyhound" (Illus. art) 117
S. V. A. Italian Ace Flying Over Congressional Palace, Buenos Aires, in, (photo) 368
Miss Toronto II., Launched (Illus. art) 675
Vickers, Six Vickers-Vimy for Transport Service 586
Vickers Viking Amphibious (Illus. art) 716
Vought, First Flight of 875
Wisenant Longitudinal Biplane, Description by M. A. Spicer (photo)... 804
Aero Squadrons:
  Air Service Reports Aero Squadron's Strength 333
  2nd Aero Squadron Holds Dinner 23
  Sent to Hawaii 23
Aero Transportation Co., of Los Angeles, Operating "Avion" Between Los Angeles and San Francisco 676
Africa:
  Aerial Advertising in, ... 480
  Aerial Mail in, ...586, 652
  Average 109.89 Miles Per Hour on Flight in, ... 552
  Blimps for 480
  Commercial Aviation in 194
Aircraft:
  Disposal or Surplus 780

PAGE

  Recommend Armament for 551
Aircraft Board, Formed at Los Angeles.... 543
Aircraft Gun to be Given Tests.... 215
Aircraft Industry, Stupendous Status of American 503
Aircraft Sales Corporation, Exhibit on Steel Pier, Atlantic City 401
Airport:
  Aerial Activities at Atlantic City 395
  International Aircraft Corp. Establishes 250
  Johnston Aviation Co. Operating Pittsburgh Airport 643
  New French Airport at Orly 844
  Opened in New York City.... 541
  Opened in Springfield, Mass.....432, 543
Air Reduction Company, Helium Experimental Plant No. 2 Moved to Langley Field 373
Air Service:
  Flying Status for Officers 843
  In West Indies.... 262
  Metal Supply on Sale.... 29
  New Duties for Officers.... 811
  Removal of Army Depot.... 651
  Sales 59
  Supply Parachutes to Units.... 261
  To Maintain Own Communication.... 683
  To Train Civilians in Flying.... 193
  To Train Foresters for Forest Observation 23
  Working with Infantry.... 125
Airships:
  Germans Surrender L-64 and L-71 to British 780
  L-72 To Cruise Over France.... 812
  Plan Berlin–San Francisco Airship Line 865
  R-38 for U. S. Navy 60 Percent Complete 843
  Roma, Italian Semi-Rigid Uselli (Illus. art) 478
Airship Manufacturing Company of America Started Operations at Hammondsport 646
Airship Station Planned for Edinburgh.. 374
Akashiba, Sub-Lt., Holds Japanese Duration Record. Flies 11 Hours 35 Minutes.. 780
Akron Flying Club Holds Annual Meet..... 506
Alaska:
  Air Trip to Alaska in Ten Hours Planned 432
  Army Aviators to Fly to 551
  Army Planes on Flight to.... 651
  Army Planes Reach.... 811
  Start Seattle–Alaska Aerial Service in July 471
Alberta, Aerial Service Thru.... 24
Allen, Col. Frederick H., To Campaign in Aeroplane 215
Altitude:
  Major Schroeder Fit for New Altitude Test 286
  Variation of Horsepower with Altitude and Compression Ratio by H. C. Dickinson, W. S. James and G. V. Anderson 54
Ambulances, Aerial:
  DH-4 Remodeled as (photo).... 407
  Inspect Aerial Ambulance at Bolling Field 515
  New Aeroplane Ambulance for Army .. 585
  Successful in Trial Flights 295
  To Convert Planes Into 23
American Aerial Company, Organized.... 13
American-French Aero Exposition, Inc., General Brett Heads.... 286
American Legion, Air Service Post Holds Successful Dance 12
American Magazine: "If You Expect Any Miracles in 1920—You Have Got to Perform Them" 247
American Railway Express Company, To Start Aerial Service 49
American Society of Mechanical Engineers Names Date of 1920 Annual Meeting 802
Anderson, G. V.: "Variation of Horsepower with Altitude and Compression Ratio," by 54, 154
Andes, Aerial Route is Needed in, ... 620
Anstead, Miss Mary L. Christens Giant Balloon U. S. No. 1 865
Antwerp, More Entries for, ... 684
Appropriations:
  Aerial Mail Will Get Appropriations if "Pernicious Lobbying" is Stopped... 48
  Naval Aviation 470
  Senate Committee Increases Aviation Allowance 181
  Senate Provides $25,000,000 for Naval Aviation 285
  $33,000,000 for Air Service.... 431
  Wants $60,000,000 for Aviation..... 150
Aquaplaning, Miss Tommie Brown of St. Petersburgh Acquaplaning Behind an Aeromarine Flying Boat (photo) 215
Argentina:
  French and Aviation in.... 194
  Military Flying School in.... 296
  Presentation of Aeronautical Material to 620
Army:
  Activities of Army Balloon School, Fort Omaha 261
  Aerial Distances Computed by, ... 59
  Aeroplanes Reach Alaska in Flight from Mineola 811
  Army Aviators to Fly to Alaska....551, 651
  Army Contracts for Armored Triplanes 643

PAGE
  Army Planes Arrive at Prince George, B. C. 779
  Army to Test Metal Planes 295
  Buys Goodyear Blimps.......... 373
  Entry in International Balloon Race Christened 865
  Flying for Reserve Officer Aviators.... 551
  Gets J.L. All-Metal Aeroplane........ 609
  Officers Strongly Endorse J.L.6........ 551
  Permits Navy to Use Mitchel Field.... 551
  Removal of Army Air Service Depot... 651
  To Do Aeroplane Forest Fire Patrol.. 193
  To Participate in the Gordon-Bennett Cup Race 747, 833
  Uses Navy Planes for Panama........ 261
Army and Navy Air Association, Annual Election of Officers of, ... 407
Ashmusen Aeronautical Co., Service Station Established at Omaha 706
Ashmusen, H. W., Obituary 13
Atlanta Airplane Co. Organized.......... 543
Atlantic City:
  Aerial Lines Planned to 215
  Aeroplanes and Motors Exhibited at.. 359
  Brilliant Gathering Marks Opening of Third Pan-American Aeronautic Congress at 355
  Exhibits on Steel Pier at 401
  F5L to be Exhibited by Navy Department. Cover, May 3rd, also........ 248
  Inlet and Curtiss Flying Station at, ...Cover May 31st
  Navy Department To Have Extensive Exhibit 248
  Official Representatives at Aeronautic Congress at 318
  162 Delegates Arrived at Aero Congress by Air 429
  Photo of View Up the Boardwalk at, .. 284
  President Wilson Will Open Aeronautic Congress by Radio.......... 317
  Sixty Aero Clubs to Send Delegates to.. 180
  Some Leading Hotels in.......... 293
  Steel Pier Where Exposition and Convention Will be Held (photo) 319
  Twenty International and National Aerial Contests to be Discussed at.. 283
Atlantic Fleet Greets Fleet Commander in Message Dropped from Seaplane.... 319
Ataches, French Air Attaches to be Appointed 684
Atwater, Lt. W. B., Invents Fluid Called Crystal-On to Keep Moisture from Glasses 802
Aurora Aviation Co. Has Started Aerial Service in Aurora 507
Austin, Lt. Charles B., to Fly from Panama Canal to Washington, D. C.......... 779
Australia:
  England Has Handed Over to Australia 28 De H-9 Machines by Way of Reciprocating Former Gift 652
  Messrs. Simpson & Tregilles to Manufacture Aircraft and Supplies in.... 507
Aviation Center:
  At Charlotte, N. C.......... 642
  At Hammondsport, N. Y. (also photo).. 646
Aviation, Civil:
  Campaign of Education Started in State of Washington 770
  Details Concerning Civil Aviation in France 812
  In Belgium 480
  70,000 Passengers Record of First Year of Civil Flying in England......... 812
Aviation, Commercial. (See page 26.) French Plan Big Part in.......... 780
Aviation General Supply Depot Assemble German Bombing Planes 651
Aviators:
  American Aviators with Poles Sink Red Monitor 552
  Former Army Aviators En Route to Cuba 150
  Naval Aviators Training to Fly Land Planes 159
Aviette:
  Continue Experiments in France...... 334
  $1,000 Challenge Trophy Offered by Aerial League of America to Popularize New Sport 325
  Two Attemps Made in France to Win Peugeot Prize 716
Awards, Decorate Officers at Kelly Field.. 295

B

Bairstow, Dr. Leonard, Professor of Aerodynamics at Imperial College of Science and Technology 408
Balloons:
  Balloon Companies Leave Fort Omaha.. 261
  Balloon Race Halted Again.......... 832
  Balloon Target for Aerial Gunnery.... 875
  Christens Giant Balloon U. S. No. 1.... 865
  List of Entries for National Balloon Race Announced 737
  Navy Balloon for International Race... 651
  Plans for Balloon Races to Chicago..... 800
  Record Weather Balloon Ascent...... 652
  Sails from Virginia to Staten Island... 472
  Transfer Balloon Races to Chicago.... 800
  U. S. Balloon Sets Record.......... 181
Balloons, Blimps:
  Fishing from Pony Blimp (photo) 674
  For Canada and South Africa......... 480

PAGE
  Propose Blimp Trans-continental Mail Service 801
Balloon Companies, 14th and 24th, to Cooperate with Coast Artillery........ 295
Balloon Division, Open Enlistment for Balloon and Airship Division.......... 227
Balloons, Dirigibles:
  Americans in Flight Over London...... 875
  American Naval Aviation Officers at Howden, England, Preparing to Bring Over R-38 ....Cover July 5th
  Army Balloon Reaches 45,225 Feet.... 113
  B-34 Taken Out for Flight.......... 652
  Balloon Entry from Italy.......... 126
  Balloonists Fly 1,200 Miles.......... 113
  Col. Hensley Tells of German Dirigible 91
  Flyers Sail to Bring R-38 Here........ 159
  German Zeppelin Airship L-71 Surrendered to England.......... 586
  Navy Dirigible Will Make Non-Stop Flight 249
  Navy to Build Record Dirigible........ 91
  New Rigid Airship Designed by Aerocruiser Company 115
  1,000 Mile Trip by R-33 652
  R-34 Plans Flight from Rome to Buenos Aires 471
  R-80 Nearly Completed 23
  R-80 Ready for Launching 748
  R-80 Ready Soon.......... 552
  Three Balloons Lost in Fire.......... 706
  United States to Build 560-Foot Dirigible 866
Banks, To Use Air Service.......... 643
Banquet, Cincinnati Aero Club Holds....... 737
Barker, Lt. Col. W. G. V. C.:
  Flies to Rotary Conference.......... 505
  Urges Commercial Flying.......... 286
Barnard, W. T. Personal Par. 320
Barographs:
  Calibration of Barographs Used by Maj. Schroeder 473
  Used in Flight Made by Maj. Schroeder of 33,000 Feet 431
Barrett, John, Message Received at Third Pan-American Congress from 396
Batchelder, Miss Lorenda J., Announcement of Marriage to Lt. Col. Piccio.. 575
Battleships Will Carry Speedy Scout Planes 407
Bauman, Milton (photo) 182
Beams, "Graphical Method for Deflection of Beams of Non-Uniform Section," by B. C. Boulton (with line drawings) .. 17
Beaver, Capt. W. E., Makes One-Stop Flight from New York to Lexington, Ky.... 800
Bechuanaland, An Aerodrome in.......... 408
Behr, Kenneth, Flies 750 Miles in 10 Hours 802
Belgium Army, Flying Allowances in....... 24
Belgium:
  Aerial Combats to be Held in Connection with Olympic Games at Antwerp .. 811
  Aerial Mail Service in Congo 194
  Aerial Post in 408
  Aerodynamic Laboratory in 334
  Civil Aviation in 480
  King Albert Presented with Aeroplane 480, 844, 868
  King and Queen Attend Wedding in Aeroplane 374
Bell, Norman, Made Assistant Sales Manager for Norma Co., of America.... 708
Bellinger, Commander:
  Asks Senate Investigation of Conspiracy Against Him 540
  To be in Charge of Operation of Air Lines 355
Bellott, Ensign, in Farman G.L.41 Wins Grand Prize of Monaco.......... 516
Bennett (Gordon) Cup Race:
  Prepare for 516
  To be Important Event.......... 262
Bermuda:
  Flying in 160
  Flying Boats for 480
  Flying Boat Service.......... 408
Bernard, J.:
  Aero Club of France Homologated Speed, Duration and Distance Record of 684
  Photo of 684
Bills:
  Introduce Bill for Aviation Development Bureau 333
  President's Bill Would Govern Aerial Navigation 358
  Would Introduce An Air Navigation Commission 431
Bird, Flying Officer C. O. Killed in Egypt 480
Birds. Remarkable Study of Bird Flight, A Flock of Pigeons at the Rexall Farms, St. Louis. ....Cover Sept. 6
Black, A. and D. R., Opens Office in Washington, D. C. 251
Black, H., On Exhibition Tour 576
Blackburn Aeroplane & Motor Co., Entering Kangaroo-Rolls-Royce in Flight to India 374
Blessley, Lt. R. C. W., Prepares Aerial Photographic Maps of the Canal Zone 333
Bleriot, M. Louis, Has Offered to Aero Club of France Sum for Safety Prize 480
Boeing Airplane Co., Army Contract for Armored Triplanes Awarded to 643
Boland, Mlle. A., Reached Altitude of 4,800 Metres 844
Bolshevists:
  American Aviators Help Poles Crush

PAGE
  Bolshevists 334
  German Aviators Act As Spies for...... 844
Bombing:
  Assemble German Bombing Planes at Middletown 651
  Aviators Bomb Ice Gorge 51
Bombs:
  Study Trajectories of Bombs from Aeroplanes 295
  Whales to be Bombed 24
Book Reviews:
  "Aeronautics," by Edwin Bidwell Wilson, Ph.D. 475
  "Aeronautics in Theory and Experiment," by W. Cowley and H. Levy.. 164
  "Aeroplane Structures," by A. J. Sutton Pippard and Capt. Lawrence Pritchard 838
  "Aircraft, Airships, Aeroplanes, etc.," by T. W. Corbin 777
  "Airplane Photography," by H. E. Ives 455, 610
  "Applied Aerodynamics," by L. Bairstow 581, 805
  "Applied Aerodynamics," by G. P. Thompson 581
  "Aviation Pocketbook for 1919–20," by R. Borlaase Matthews 326
  "British Airships," by Geo. Whale, 581, 777
  "Design and Construction of Aero Engines," by C. Sylvester.......... 326
  "Design of Screw Propellers," by Henry C. Watts 713
  "Dyke's Automobile Encylopædia"..... 326
  "Electro-Deposition of Metals," by Dr. George Langbein and William T. Brannt 617
  "Exporter's Gazeteer of Foreign Markets," by L. R. Morris 805
  "How to Fly and Instruct on an Avro," by F. Dudley Hobbs 713
  "In the Side Shows," by Capt. Wedgewood Benn 164
  "Landing Field Guide and Pilots' Log Book," by Capt. Bruce Eytinge...... 326
  "Luck on the Wing," by Major Elmer Haslett 581, 777
  "Motor Vehicles and Their Engines," by Edw. S. Frazer and Ralph B. Jones 713
  "Text-Book on Navigation and Nautical Astronomy," by J. Gill 713
  "Tin, Sheet-Iron and Copper-Plate Worker," by Leroy J. Blinn......... 839
  "Triumph of NC's," by Com. G. C. Westervelt, H. C. Richardson & Lt. Com. A. C. Read..........581, 777
Bossoutrot:
  French Aero Club Homologated Speed, Duration and Distance Record of.... 684
  Official World Speed Record......... 326
  Photo of 684
  Wins "Grand Ecart" Prize.......... 812
Bottriell, Sergt., Sets Parachute Record.. 585
Boulton, B. C.:
  "Graphical Method for Deflection of Beams of Non-Uniform Section," by 17
  "Preliminary Choice of a Wing Section," by 839
  "The Structural Analysis and Design of the Aeroplane," by 710, 742, 755
Bowman, John M. E., of the Biltmore, Makes Initial Flight (photo) 285
Brashear, Dr. J. A. Obituary Notice..... 182
Brass, Brochure Entitled: "Seven Centuries of Brass Making," Issued by Bridgeport Brass Co. 577
Brazil:
  Government Signed Contract with Handley-Page—Service to Start Soon 684
  Military Flying School Active 780
  Navy Gets Four Aeromarine Flying Boats from U. S. Navy.......... 586
Breese, Robt. Potter, Personal Par. 399
Brett, General L. M., Heads American-French Aero Expo., Inc. 286
Bristol Aeroplane Co. Buys the Cosmos Engineering Co. 748
Britain:
  Aircraft Sale 114
  Airship R-80 Soon Ready.......... 552
  $500,000,000 Aero Supplies Sold to Syndicate 92
  Germans Surrender Airships L-64 and L-71 to 780
  Great Flying Deck of British H.M.S. Eagle ....Cover Aug. 16
  National Airship Factory for Britain.. 442
  Opening of British Aircraft Competitions 844
  To Receive Assistance on Italian Aerodromes 262
  To Train U. S. Airship Pilots......... 193
British Advisory Committee for Aeronautics, Reports 442
British Air Ministry, Issued List of Aerodromes 442
British and Colonial Aeroplane Co., Clifford B. Prodger. Famous Test Pilot, Associated with 286
Bromwell, Miss Louise, Makes Record of 87 Loops 800
Brooks, Capt. Arthur R. In Command of First Pursuit Group, Kelly Field... 619
Brown, Lt. Ray W.:
  Official World Speed Record.......... 326

PAGE
  Takes Off on Runway of Boxes...... 23
Brown, Miss Tommie, Acquaplaning Behind an Aeromarine Flying Boat (photo) 215
Buildings Planned for Aviation Offices 360
Bulloch, Noel E.:
  Is Shown Changing from a Motorcyle to a Plane (photo) 513
  Pilot for Superior Fliers Aircraft Co. (photo) 250
Bureaus, Lep Aerial Travel Bureau Issues Leaflet on Aerial Touring 620
Bureau of Standards Conducting Experiments with Aeroplane Instruments .. 164
Burnelli, Vincent J., Photo of............ 740
Butler, W. G., Makes Business Trip by Air 542

C

Cabot, Godfrey Lowell, Acquired Patent for Launching Mechanism for Aircraft.. 259
California:
  Aircraft Board Formed at Los Angeles 543
  Alturas Buys Landing Field.......... 706
  Chamber of Commerce of Nevada City to Establish Municipal Landing Field 834
  Landing Field at Yreka................ 675
California Aerial Transport Co.:
  First Inter-City Aerial Service for Passengers Started by 399
  To Operate Passenger-Carrying Service Between San Francisco and Los Angeles 360
Cameras:
  Air Service Camera K-1 Took Photographic Mosaic of Camp Bragg...... 515
  Board to Test Aerial Cameras........ 227
  Fairchild Aerial Camera.............. 183
  To Test Sky Light.................... 320
Camouflage, Aeronautical, by William R. Weigler (Illus. art) 288
Campaign, Aerial, Prohibitionists to Make Aerial Campaign 868
Campbell. Mark M., to Start on Exhibition Tour 432
Canada:
  Air Plans for Pacific Coast of, ... 24
  Blimps for South Africa and, ... 480
  Canadian Air Force to be Formed 149
  Enrolls New Air Militia 407
  Helium Tests Succeed in............ 652
  Indian and An Aeroplane At St. Challes, Manitoba (photo) 576
  Manitoba Candidates Use Aeroplanes.. 652
  Two More Aerodromes for........... 716
Canadian Aero Film Co. to Make Movies of Hudson Bay with Seaplane 800
Caproni, Gianni, Arrives in New York.... 149
Carbureters:
  Claudel Carbureters Now Made in America (Illus. art) 323
  Discuss Carbureters for Army Aviation Service 227
Carriers, Aeroplane, New British Models.. 586
Casale, Jean:
  Has Been Awarded Leon-Morane Challenge Trophy 684
  Official World Speed Record.......... 326
  Shut in Air-Tight Bell, Prepares to Attain 7½-Mile Height................ 552
Cecil, Lt. Com. Henry B., Heads NC Plane Division 811
Certificates, Flying Certificates for Reserve Officers 715
Chamberlain, Pilot C. D., Flew in Bellanca Plane from Mitchel Field to Glens Falls, N. Y., 220 Miles in 2 Hours 5 Minutes 643
Chamber of Commerce, of Nevada City, Calif., to Establish Municipal Landing Field 834
Chaney, Lt. Col., and Mrs. James E., Starting in a Balloon Race Held in Italy (photo) 620
Chaplin Aircraft Corp. Syd. Has Purchased Two Flying Boats for Tourists 643
Charlton, L. E. O.. Flies at Hawaii........ 358
Charter, Aeroplane Dealers' Assn. of America Granted, ... 251
Charts, Marine Chart Corrected from Aeroplane 747
Chase, Herbert, With Power Plants Corporation 13
Chavez, M., To Unveil Monument to, ... 748
Chicago, Airscape of Freight Yards of, ...Cover Aug. 9
China:
  Aerial Mail in, 480, 507, 516, 552, 586 780
  Appoints Assistant Commissioner for Aerial Derby 334
  Aviation Company in Hong Kong...... 262
  Col. F. V. Holt, R.A.F., Appointed Aero Adviser to, ... 24
  Handley-Page in, ...193, 228, 408
  To Assist French Manufacturers in, .. 748
Christens Giant Balloon U. S. No. 1...... 865
Cincinnati Aircraft Co. Terminal Opened.. 360
City College of New York, Lecture at...... 50
Claims for Damages Resulting from Operation of Aircraft 619
Clark, Milton O., Appointed Assistant Commissioner for China for Aerial Derby 334

PAGE
Claudel Carbureter Co., "Carbureter Now Made in America," (Illus. art) 323
Cleaner, Outlook Windshield Cleaner (photo) 506
Cleveland Aviation Club, Elect Officers.... 216
Clubs, Plan Officers Club and Memorial Hall in New York 683
Coast Artillery, Balloon Companies to Cooperate with, ... 295
Coast Guard, Gets Life-Saving Seaplanes.. 811
Cockardes, No Cockardes on Civil Aircraft in France 748
Coffin, Dr. J. G., Flew to Attend Dedication of Langley Memorial Laboratory.... 506
Coli, Aviator, Commercial Flight Made by.. 716
College of the City of New York to Have Evening Aeronautic Courses........ 543
Colleges, Imperial College of Science and Technology Announces That Dr. Leonard Bairstow Has Accepted Professorship of Aerodynamics 408
Collier, Robert J., Aeronautic Patent Situation—Problem Almost Solved in 1915 by, ... 573
Collins, H. E., "Description of Apparatus for Measurement in Wind Tunnel of Performance of Airscrew or Windage Torque of Rotary Engine," by, ... 118
Colvin, D. Leigh, Prohibitionist, to Make Aerial Campaign 868
Combats, Aerial, To be Held in Connection with Olympic Games at Antwerp.... 811
Commercial Airship Syndicate:
  Christening of First Dirigible of, (photo) 479
  Optimist Club of Kansas City Held Meeting in Hangar of............. 505
Aviation, Commercial (See page 18):
  New Commercial Aviation Programme in France 194
  In South Africa 160, 194
Commissions:
  Columbus, Ohio, Forms Aviation Commission 541
  Seventy Navy Aviation Commissions Open 875
Compagnie Franco-Roumaine De Navigation Aerienne, In Course of Formation.. 812
Compass:
  Radio Compass Guides Aeroplanes in Air 450
  Seaplane Flies by Radio Compass...... 683
Competitions:
  French Competition for Peace-Time Aero Engines 509, 876
  French Competition for Motors Postponed 812
  Opening of British Aircraft Competitions 844
Concord Aircraft Co., Successfully Operating Aerial Lines 769
Coney Island, Airscape of Luna Park, ...Cover Aug. 30
Congo, Aerial Service in, ... 296
Congress:
  May Pass New Metric Law 706
  U. S. Attorney General Requested by Congress to Recover Funds Fraudulently or Illegally Paid to Constructors 213
Connecticut Aerial Navigation Co. Operating Flying Boats 507
Connolly, Major Maurice:
  News Item 50
  Photo of 49
Contests:
  An Exciting Moment in a Contest at Miami, Fla. ....Cover May 17
  Twenty International and National Aerial Contests to be Discussed at Atlantic City, May 20-30 283
Contracts, Army Contracts for Armored Triplanes 643
Conventions:
  Aerial Convention is Signed by U. S. 472
  Convention Photographs Sent by Plane 619
  Plan State Aero Convention in St. Paul 706
  Protocol to International Air Convention 684
  Swiss-German Convention 408, 442
Coombs, Aviator C. B.:
  Note Concerning 881
  Photo of, with "Texas Wildcat" 736
  With Orenco 217
Cooper, Capt. Merion:
  Apointed Commander of Kosciusko Squadron 609
  Killed in Poland 812
Cortinez, Lieut.:
  Photo of, in Flight Over Andes....... 358
Cosmos Engineering Co. Purchased by Bristol Aeroplane Co.................. 748
Country Club:
  To Feature Aviation 181
Courses, Aviation:
  Evening Aeronautic Courses at New York City College 543
  Harvard Plans Course for Aviators.... 575
Courtney, F.:
  Looping a Boulton-Paul Type Biplane (photo) 876
Covers:
  Above the Swiss Alps............March 29
  Airscape of a Section of Coney Island ....June 7
  Airscape of Chicago Freight Yards, Aug. 9
  Airscape of Chicago Showing Municipal Pier ....July 12

PAGE
  Airscape of Gatun Locks of the Panama Canal ....Aug. 23
  Airscape of Luna Park, Coney Island ....Aug. 30
  Airscape of Polo Grounds, New York, Taken from Curtiss Oriole......June 14
  Airscape of Rhode Island State House ....Aug. 2
  Airscape of U. S. Naval Aviation Station at Anacostia and Bolling Aviation Field ....July 19
  American Naval Aviation Officers at Howden, England, Preparing to Bring Over the R-38..................July 5
  Atlantic City Show Number........May 24
  Capt. H. S. Broad Climbing in a Sopwith Camel ....April 12
  Demonstrating the Maneuverability of Interallied Aircraft Corp. Avors at Mitchel Field ....May 10
  Ensign Franklyn Young Flying Off Gun Platform of U. S. S. Mississippi, April 5
  Exciting Moment in Contest at Miami. Florida ....May 17
  Florida–West Indies Airways Flying Boat En Route ....March 22
  Formation of Bristol Fighters......June 28
  Four-Motored Handley-Page Cruiser Over Long Island ....April 26
  Great Flying Deck of the British H. M. S. Eagle ....Aug. 16
  Inlet and Curtiss Flying Station at Atlantic City ....May 31
  Modern Method of Observing Automobile Races—An Aerial Photo of a Motor Speedway...............April 19
  One of F5L Navy Department Will Exhibit at Atlantic City ....May 3
  Remarkable Study of Bird Flight, a Flock of Pigeons at the Rexall Farm, St. Louis ....Sept. 6
  Sport Supreme—Racing Yachts and Aeroplanes ....July 26
  U. S. Naval Flying Boat Over Pensacola Harbor ....Mar 15
S. E. J. Cox Gordon-Bennett Expedition, (Illus. art) 867
Cox, Mrs. S. E. J.:
  Christens "Texas Wildcat" (photo) ... 867
  Note Concerning 881
Cox, S. E. J.:
  Named by Aero Club of Texas to Pilot Aeroplane in International Air Races 641
  Photo of Mr. and Mrs. Cox and Seymour, Jr. 706
  Photo of, with "Texas Wildcat"....... 736
Cranker, New Portable Cranker a Success 331
Craven, Capt. T. T.:
  Inspects Langley Air Station......... 551
Crissy, Major Dana H., Air Service Field Named for 125
Crossley Co. Has Been Unified with A. V. Roe & Co. 543
Crystal-On, Fluid to Keep Moisture from Glasses Being Manufactured........ 802
Culver, Major C. C.:
  Honorary Degree of Electrical Engineer Conferred Upon.................. 551
  In Charge of Air Service Radio Work 407
Culver Military Academy, Aeronautics to be Studied at 674
Curtiss Aeroplane and Motor Corp.:
  Buys Hazlehurst Flying Field......... 676
  Commences School of Instruction..... 250
  Decision Handed Down in Curtiss-Janin Suit 285
  Flying Station at Atlantic City, ...Cover May 31
  In Action Against United Aircraft Engineering Corp. 574
  New Members of Organization........ 708
  Salvaged Aeroplanes Stored at Love Field Sold by War Dept. to........ 373
Curtiss Distributors Meet (also photo).... 83
Curtiss Eastern Airplane Co. Opening of Pine Valley Flying Field............ 507
Curtiss Engineering Corp. Awarded Contract for Nine Torpedoplanes for U. S. Navy 715
Curtiss, Glenn H., Aernautic Patents Situation as Related to 573
Curtiss–New York Aircraft Corp. Latest Addition to List of Curtiss Distributors 473
Customs, Aerial:
  First Plane to Pass Through U. S. Aerial Customs 431
  French Station for Aeroplanes........ 262
  French Establish Aeronautical Custom House 552
  Swiss Customs Station for Aircraft.... 748
Cuterrez, Don. J. Antonio Lopez, Address Made at Third Pan-American Congress by 396
Czecko-Slovakia, Air Force................ 126

D

Daily Express, £10,000 Indian Flight...... 552
Damages, Claims for Damages Resulting from Operation of Aircraft........... 619
Daniels, Hon. Josephus, Messages Received at Third Pan-American Congress from 396
Dare, Ethel, To Change Planes in Air 12

PAGE

- Darracq-Talbot and Sunbeam Merge...... 652
- Davis-Douglas Company to Build Aeroplanes 868
- Davis, E. G., Announces Expansion of Titanine, Inc. 473
- Davis, Reed E.:
  - Pilot Bullock is Shown Changing from a Motorcycle to a Plane Piloted by (photo) 513
  - Pilot for Superior Fliers Aircraft Co. (photo) 250
- Debeer, Lt., Average 109.89 Miles per Hour on Flight in South Africa.... 552
- Defense, Aerial, U. S. Erecting Aerial Coast Base 125
- De La Meurthe, Mme. Henry Deutsch, Has Given 10,000 Francs to Faculty of Science to Found Bursary.......... 296
- De Luxe Air Service Inc. Has Formed Aerial Service at Asbury Park, N. J. 397
- De Lysle, John, Flies by Aeroplane to Elude Scotland Yard 748
- Demblanc, Louis (Engineer) Invented "Alerian" Aeroplane 249
- Denmark, Commercial Aviation in.....408, 442
- Derby, Aerial:
  - In Galveston, Texas 737
  - In London, England........ 780
- Derby, Around the World:
  - Appoint Assistant Commissioner for China for 334
  - Committee Receives Cordial Welcome in France 469
  - Plans to Hold Derby Around South America 112
- de Romanet, Bernard, Official World Speed Record 326
- Deschanel, M., Has Acquired a De Luxe Farman Aeroplane 652
- Deshayes, Mlle. Gabrielle, Has Qualified for Pilot's License 716
- Diaz, Lt. Jacinto Rodriquez, Personal Par. 380
- Dickinson, H. C., "Variation of Horsepower with Altitude and Compression Ratio," by 54, 154
- Dickson, H. C., "The Investigation of Aircraft Radiators at the Bureau of Standards," Communicated by....476, 511
- Diggins' Flying School, Ralph C., Activities 738
- Dinsmore, Miss Marion Carey, To be Married to Francis May Simonds, Jr. 866
- Domenjoz, Jean, To Give Exhibitions with Bleriot Monoplane 320
- Donaldson, Capt. J. O., Commanding 94th Squadron 23
- Dope:
  - Fireproof Dope Test........ 431
  - Phenix Fireproof Dope........ 870
- Dumesnil, General, New French Military Aeronautics Chief 92
- Dunton, Lt. Photo of........ 551
- Duralumin, By E. Unger and E. Schmidt (Illus. art) 772
- Durant, R. C. (Cliff) Plans Building for Aviation Offices........ 360
- Dutch East Indies, Plan Flight from Holland to 228

E

- Easterbrook, Lt. Arthur E., Transferred to Infantry 91
- Eastern Aircraft Corp. Announces Opening of Airport at Springfield, Mass....... 432
- Edinburgh to Have Airship Station 374
- Edwards, Governor, Edw. A.:
  - Christens "Aeromarine F5L Navy Cruiser" (with photo of Cruiser) 575
  - Makes Flight in Flying Boat at Belmar, N. J. 543
- Edwards, James A. Personal Par. 399
- Ellington Field Aviators to Hold Reunion 49
- Elton, Robert W., "The Fairchild Distant Control for Aerial Cameras," by 713
- Engines:
  - Compressed Air Motors, by J. F. McMahon 295
  - Navy Dept. Orders Aircraft Engines from Packard Motor Car Co. 802
  - Steam Engines by J. F. McMahon 552
- Engines, Types:
  - Anzani, The Mounting of (Illus. art).. 435
  - British, New Type of 114
  - Hispano-Suiza, Engines at Nebraska Aircraft Factory (photo) 51
  - Liberty, Brequet Plane Fitted with.... 333
  - Napier, 450 H.P. Engine (IIllus. art).. 19
  - 150 H.P. Used in Orenco "F" Tourister 255
  - Packard, Type 2025 (Illus. art)....... 612
  - Rausie E-6, 175 H.P. (Illus. art)...... 362
  - Sunbeam, 12 Cyl. 800–900 H.P. Sunbeam-Coalalen (Illus. art)........ 221
- England Has Handed Over to Australia 28 De H-9 Machines by Way of Reciprocating Former Gift 652
- Equipment, Complete Set of Aerological Equipment for Pearl Harbor 779
- Ericson, F. G.:
  - Miss Toronto II. Built by, in Race with Canuck Training Plane 834
  - Mrs. F. G. Ericson Christens "Miss Toronto II" 675
  - With Mrs. Ericson and Baby Lorraine (photo) 472
- Esch, Congressman John J., Message Received at Third Pan-American Congress from 396
- Esnault-Pelterie, M. Robert, Has Brought Action to Recover Damages from Constructors for Infringement of Patent 876

PAGE

- Exhibitions:
  - At Opening of Pine Valley Flying Field 609
  - Campbell, Mark M., to Give Exhibition Again 432
  - Commercial Aircraft Exhibitions at Cricklewood 334
  - Domenjoz to Give Exhibitions with Monoplane 320
  - McLaughlin and Kelly on Exhibition Tour 576
  - Oakley Aerial Esquadrille Giving 542
  - Plan First International Aero Exhibition in Prague 876
  - Turin Exhibition Postponed 374, 442
- Exhibits on Steel Pier at Atlantic City...... 401
- Expeditions:
  - Another Expedition by Royal Air Force 194
  - S. E. J. Cox Gordon-Bennett Expedition (Illus. art) 867
- Experiments:
  - British Government Conducting Experiments with Pilotless Aeroplane 296
  - Continue Experiments with Aviettes in France 334
- Exposition in Philadelphia Postponed 81

F

- Fabric, Experiments with Fokker Show Non-Inflammable Fabric Used 183
- Fabric Fastenings by E. D. Walen and R. T. Fisher 474
- Factories:
  - National Airship Factory for Britain .. 442
  - Plan Large Aeroplane Motor Factory.. 51
- Fairchild Aerial Camera Corp.:
  - Camera (Illus. art) 183
  - Expands 643
  - Fairchild Distant Control for Aerial Cameras by Robert W. Elton 713
  - Ives, Dr. Herbert, Has Joined Corporation as Consulting Engineer 398
- Fargo Interstate Aircraft Corp. Organized. 507
- Farman, Miss Andree (photo) 262
- Fastje, Carl, Model Built by (with photos) 813
- Fauntleroy, Major Cedric, Appointed Chief of Aviation of Second Army 609
- Favier, Louise, Flies to 21,325 Feet...... 652
- Ferrarin, Lt. Reaches Tsingau in Rome to Tokio Flight 374
- Fewster, T. H., "Description of Apparatus for Measurement in Wind Tunnel of Performance of Airscrew or Windage Torque of Rotary Engine," by...... 118
- Fields, Aviation:
  - Alturas, California, Buys........ 706
  - At Albany Almost Ready 706
  - At Cincinnati 82
  - At Medford, Oregon 833
  - Army to Buy Selfridge Field........ 227
  - Aviation Country Club of Detroit Purchases Land for 674
  - Being Secured in Georgia 398
  - Curtiss Buys Hazlehurst Flying Field.. 675
  - Eaton Rapids Has Municipal Landing Field 216
  - Emporia, Kansas, to Have........ 542
  - For Del Rio, Texas........ 541
  - Gallaudet Planes at Rhode Island Aviation Field 577
  - Inter-State Airplane Company Buys Payne Field 287
  - Kearney, Nebraska Has Field 609
  - Landing Fields for California–Oregon Towns 801
  - Landing Field at Yreka, California.... 675
  - Landing Field at Oklahoma City...... 706
  - Lawson Air-Line Corp. Asks City for Aeroplane Landing Field........ 115
  - Logan Aviation Company Opens Flying Field 321
  - Mark Landing Field at Springfield, Mo. 611
  - New Field for Canal Zone Planes...... 515
  - Ogden, Utah, to Have........ 507
  - Opening of Pine Valley Flying Field 507, 609
  - Open Field at Ridgewood, N. J....... 642
  - Of Ashmusen Aero Company........ 706
  - Propose Fields on Highways........ 800
  - Rhinelander, Wisconsin, to Have...... 543
  - Rolfe-Epps Flying Field at Athens, Georgia 181
  - Select Landing Field at Dawson for Yukon Flight 575
  - Spokane to Have Two Flying Fields.... 249
  - Yolo Fliers' Club Opens New Field... 833
- Finger Lake Air Line Corp. Flying Boat Service Started by 738
- Finland, Swedish–Finnish Aerial Service Started 516
- Fires:
  - Aeroplanes Detect 17 of 19 Fires...... 833
  - Six Aeroplanes Lost in........ 747
  - Three Balloons Lost in........ 706
- Firman, George, Manager of Little Rock Board of Commerce (Illus. art) 770
- Fisher, R. T., "Fabric Fastenings," by.... 474
- Flagg Aeroplane Co. Starts Night Passenger-Carrying Flights 770
- Flandin, M.:
  - Photo of 321
  - Suggests Using Machines for Aerial Propaganda 684
- Fliers' Reserve Corps 126
- Flights:
  - Account of New York to Barbourville Flight 866
  - Aerial Ambulances Successful in Trial Flights 295
  - American Aviators Carry Messages to Poles 12
  - Americans in Dirigible Flight Over London 875
  - American Ladies Fly from London to Paris 60
  - Army Aviators to Fly to Alaska....... 551
  - Army Planes on Flight to Alaska 651
  - Army Planes in Flight from Mineola Reach Alaska 811
  - Army Planes Reach Nome, Alaska, from New York 875
  - Austin, Lt. Charles B., to Fly from Panama Canal to Washington, D. C... 779
  - Australian Flyers in India 228
  - Average 109.89 Miles per Hour on Flight in South Africa 552
  - Aviator Fronval Loops the Loops 962 Times Over Paris 516
  - Avro Flies from New York to Minneapolis in 16½ Hours........ 770
  - Avro Plane Makes Good Cross-Country Trip 738
  - Balloon Sails from Virginia to Staten Island 472
  - Barker, Lt. Col. Urges Commercial Flying 286
  - Beaver, Capt. W. E., Makes One-Stop Flight from New York to Lexington, Ky. 800
  - Boeing Aeroplane Crosses Cascade Mountains in Flight from Seattle, Wash., to Portland, Ore. 811
  - British Air Attaché Flies at Hawaii.... 358
  - Butler, W. G., Makes Business Trip by Air 542
  - Cairo to Cape Town Flight Finished.... 160
  - Calcutta-Bombay Flight 194
  - Caproni Plans New York to Paris Flight in 36 Hours 641
  - Casale, Jean, Prepares to Attain 7½-Mile Height 552
  - Caudron, Five-Engine, Flies 124 Miles Per Hour 516
  - Chamberlain, C. D., Flew from Mitchel Field to Glens Falls, N. Y., 220 Miles, in 2 Hours and 5 Minutes 643
  - Circumaviating America in an Avro.... 474
  - Commercial Trial Flight Made by Sadi Lecointe and Coli 716
  - Cortinez, Lt., In Bristol Monoplane at Santiago, Chile, Starts on Flight Over the Andes (photo) 358
  - Curtiss F Type Flying Boat Flies from St. Petersburg, Fla., to Springfield, Mass. 505
  - Curtiss H-16 Flies from Florida to New York 319
  - Cutiss JN-4 Fast Flight from Daytona Fla., to Savannah, Ga. 320
  - Cross-Country Flight Begun in Gallaudet Plane 800
  - Cup Racer Flies 223 Miles an Hour at Trials 865
  - DH-9 Makes Fast Non-Stop Cross-Country Flight 333
  - Daily Express in £10,000 Indian Flight 552
  - Deullin, Capt. M. de Fleurieu and a Mechanic Flew from Prague to Paris in 5 Hours 10 Minutes 620
  - Edwards (Governor) Makes Flight in Flying Boat at Belmar, N. J......... 543
  - End Rome–Tokyo Flight........ 516
  - Eventful Flight from Greenville, Miss., to Cincinnati, Ohio 611
  - Fast Flying in Italy 194
  - Fast Flight from Yakima to Tacoma, Washington 866
  - Ferrarrin (Lt.) Reaches Tsingtau in Rome to Tokio Flight 374
  - First Long Distance Aerial Commuters Fly from Florida to New York...... 319
  - Flagg Aeroplane Co. Starts Night Passenger-Carrying Flights 770
  - Flies from London to Paris Before Banks Closed 516
  - Flies to Bull Ring........ 552
  - Flies to Golf Links at Scotch Tournament 552
  - Flies Across Sahara 160
  - Flies from New York to Tulsa, Okla... 286
  - Flies 1,150 Miles in One Day........ 11
  - Flies from Washington to Ottawa in Four Hours 215
  - Flies from Pekin in Handley-Page..... 374
  - Flies from Paris to Warsaw........ 552
  - Flight from Boston to Auburn, Me. .. 358
  - Flight from Tokio to Seoul 228
  - Flight from Toronto to Akron, Ohio, Made by First Aeroplane of the National Airway Service Co. 358
  - Flight Made by Potez Biplane 586
  - Flight Over the Andes 228
  - Flight to Canal Zone Requested...... 515
  - Flight to Java by Dutch Aviators.... 126
  - Flight to be Made from Rome to Buenos Aires 442
  - Flights on Palestine Border........ 552
  - Flights from Paris to Rome and Madrid 748
  - French Aviators Finish Trip from Paris to Dakar 194
  - French Aviatrix in Flight of 2½ Hours Reached Altitude of 4,800 Metres... 844
  - Goliath Broke Record for Continuous Flight 471
  - Gran, Major, Flew from London to Norway 684

PAGE

Handley Page in China ... 228
Handley Page Reaches 13,999 Feet with 3,690 Pounds Load ... 480
Hinkley, Lt., Starts Alone on Flight from London to Australia ... 480
Inspection Flight Made in Egypt ... 126
Italian Flyers Reach Seoul ... 442
Japanese General Flies with American Officer ... 249
Japanese Make Tokio–Seoul Flight ... 296
JL-6 Completes Trans-continental Round Trip ... 832
JL-6 Makes 1,200-Mile Non-Stop Flight 575
JL Monoplanes Reach Omaha on Transcontinental Trip ... 736
Landis, Judge K. M., Makes Free Balloon Flight ... 215
Lincoln-Standard Plane Flies from Denver to Salt Lake City ... 738
Mail Plane at 16,000 Feet Breaks Record for Trip ... 544
Makes Records in Paris–Lyons Flight.. 194
Marshall, R. C., and Lt. Frank Palmer Fly from Daytona, Fla., to Dayton, Ohio ... 642
Meeker, Ezra, Covers Route in Aeroplane He Covered with Ox Team.... 706
Metal Plane Flies 248 Miles in 145 Minutes from Washington to Central Park, L. I. ... 505
Much Flying in England ... 262
Much Flying by London, Paris and Brussels Aerial Services ... 228
Munter, H. A., Flies from Seattle to Spokane Over Cascade Mountains at Altitude of More Than 10,000 Feet.. 643
Munter, Herbert A., Makes Flight of 500 Miles in 90 Minutes ... 576
Naval Dirigible C-10 Flies at 55 Miles an Hour ... 319
Naval Flight from San Diego to Panama 875
Navy Dirigible Will Make Non-Stop Flight ... 249
Netherwood, Major Douglas B., Reaches 27,000 Feet in DH 4-B ... 505
New York–Alaska Aeroplanes Reach Erie, Pa. ... 683
New York–Alaska Planes Leave Edmonton ... 747
New York Men Commute in Seaplane.. 609
New York–Alaska Planes Near Nome.. 843
New York–Nome Flight Set for July.. 471
Nice to London in 9½ Hours... 126
Notice of Civil Flying in Switzerland.. 296
Offers Free Air Trips ... 13
1,000-Mile Trip by R-33... 652
Orenco Four-Seater Plane Climbs 16,200 Feet ... 319
Oriole Flies from San Francisco to Spokane ... 320
Pacific Coast Flight in Seaplanes ... 29
Panama–Washington Flight Scheduled for Next Month ... 843
Paris to Prague with One Stop... 194
Paris to Warsaw via Prague ... 480
Plan Balloon Ascent of 50,000 Feet.... 81
Plan First Flight Around the World.. 736
Plan Flight from Holland to Dutch East Indies ... 228
Plan a London – Portuguese – Guinea Flight ... 296
Plan 10-Hour Flight Across U. S.
Planes En Route to Alaska Reach Fargo, N. D. ... 715
Plans Glass Cage for High Flight 58
Poulet, M., at Moulmein ... 228
Practice Aerial Combat by Kelly Field Groups ... 227
Prague–London in 7¾ Hours... 334
Predict 10-Hour Trip from Brest to New York ... 334
Preliminary Report on Free Flight Tests 677
Proposed Rome–Antwerp Flight ... 126
Record Flight of Navy Seaplanes 715
Roget, Lt., Flies from Lemberg to Bucharest ... 748
Roget, Lt., Flies with Air Compressor 228
Rome–Tokio Flight ... 92
R-34 Plans Flight from Rome to Buenos Aires ... 471
Schroeder, Major R. W., Makes Altitude Flight 33,000 Feet ... 431
Seaplane Flies from Miami, to New York City in 15 Hours 35 Minutes.. 285
Seaplanes Fly Between Rome and Athens ... 228
Seven German Zeppelins Fly to Russia 374
750 Miles Flown in 10 Hours by Messrs. Sprunt, Behr and Tucker... 802
Snook, Miss Neta, Took Her Mother for a Flight ... 506
Successful Flight in Gale ... 11
Three Italian Aero Squadrons at Albania ... 228
Three of Four U. S. Army Planes in Flight from Mineola to Nome, Alaska, Reach Prince George, B. C... 779
To Fly from St. Petersburg, Fla., to Springfield, Mass. ... 250
To Select Landing Field at Dawson for Yukon Flight ... 575
Tucker, Harrison R., Makes Record Flight with Farman "Tourabout" .. 575
Two of the Three JL All-Metal Planes in Trans-continental Flight Reach Pacific Coast ... 768
Zeppelin May Circle Globe ... 800
Zuloaga Intends to Attempt to Cross the Atlantic ... 652

PAGE

Flying Boats:
  Brazilian Navy Gets Four Aeromarine Flying Boats from U. S. Navy... 586
  Chaplin, Syd., Aircraft Corp. Has Purchased Two Boats for Tourists .. 643
  Conn. Aerial Navigation Co. Operating 507
  For Bermuda ... 480
  Ohio Valley Aero-Transport Co. to Use H-S2L ... 507
  Over Pensacola Harbor......Cover Mar. 15
  Savoia Flying Boats for Sweden ... 780
  Service in Bermuda ... 408
  Service Started by Finger Lakes Air Line Corp. ... 738
  Supermarine Racing Flying Boat at Monaco (photo) ... 609
  Tandem Monoplane Flying Boat to Carry 10 Tons (Illus. art)... 801
  The Obertz Flying Boats (Illus. art) .. 440
  To Be Used in Service Between New York and Atlantic City ... 675
  Two H52-L Belonging to Aero Ltd., Used to Carry Grapefruit ... 675
  Two NC Flying Boats Awaiting Shipment to San Diego ... 610
Flying Circus:
  Lt. G. W. Shaw Forms Flying Circus 215
  Started by Williams-Hill Aeroplane Co. (Illus. art) ... 399
Flying Stations:
  Curtiss Flying Station at Atlantic City ......Cover May 31
  Proposed by Navy for Great Salt Lake. 397
Fokker, M., Speaks to Durch Aviation Association ... 374
Ford, Henry,
  Representative of Zeppelin Co., of Germany, Endeavoring to Interest ... 543
  To Build Dirigible on Approval ... 49
Ford Motor Co., To Build Aircraft ... 287
Forest Products Laboratory:
  Decennial Celebration ... 181
  Kiln-Drying Course at ... 321
  Resistance to Decay Now a Factor in Choice of Aeroplane Wood... 292
Foulois, Major Benjamin D., Former Director of Aircraft Production Relieved 373
Fowls, Series of Experiments Covering Flying Ability of Fowls Made by Philadelphia Aero–Service Co. ... 250
France:
  Aerial Navigation in, ... 812
  Aerial Prizes in, ... 480
  Air Attachés to be Appointed... 684
  Air Minister Suggests Using Machines for Aerial Propaganda ... 684
  Civil Aviation in ... 812
  Concerned Over German Aerial Activities ... 374
  Flyer Makes Record ... 262
  French Aeroplanes to Police Sahara.. 652
  French Civil Air Routes... 296
  French Competition for Motors Postponed ... 812
  French Establish Aernautical Custom House ... 552
  French Government Competition ... 876
  French Plan Big Part in Commercial Aviation ... 780
  Gives Cordial Reception to Committee Organizing First Aerial Derby Around the World ... 469
  Greeks Hit French Aeroplane ... 716
  Increase Aerial Tourist Lines in... 552
  Many Planes at Reports in ... 552
  New Commercial Aviation Programme.. 194
  New French Airport at Orly... 844
  New French Airships for Training.... 296
  New French Commission... 194
  Parisians Hail with Joy Arrival of a Zeppelin ... 844
  Plan Franco-Swiss Aerial Service... 780
  President Deschanel Has Acquired a De Luxe Farman Aeroplane... 652
  Progress of French Naval Air Service.. 92
  Seaplanes Classed as Ships in ... 586
  Super Zeppelin Delivered to ... 684
  To Open Customs Station ... 262
  Training of Reserve Pilots in ... 620
  Treaty of Versailles Allocated Two Zeppelins to ... 442
  Using Many Aircraft in Trade ... 296
  Wright Memorial at Le Mans... 262
Franco-Rumania Co., Entry for Competition at Antwerp Made by... 684
Fravel, Col., Ordered to Texas ... 193
Freeland, Lt. E. M., Circumaviating America in an Avro (with photo) ... 474
Fronval, Aviation:
  Flew from Paris to Madrid ... 748
  Loops the Loop 962 Times Over Paris.. 516
Funds:
  Formation of Royal Air Force Memorial Fund ... 575
  U. S. Attorney General Requested by Congress to Recover Funds Fraudulently or Illegally Paid Constructors.. 213
Fuselage Stress, Analysis by Edward P. Warner and Roy G. Miller (line drawings) ... 119

G

Gallaudet Aircraft Corp., Planes at Rhode Island Aviation Field ... 577
Gatun Locks, Airscape of, ...Cover Aug. 23
Gaubert, Louis:
  "Impressions of an Aerial Tour in America," by (Illus. art)... 508
  On Aerial Tour in Farman Tourabout

PAGE

  (Illus. art) ... 320
Georgia, Aviation in Georgia is Given Recognition ... 676
Gerhardt, W. F., "Preliminary Choice of a Wing Section," by ... 839
Germany:
  Activities in ... 716
  Aerial Post to be Opened at Innsbruck 374
  Air Force to Disappear Soon... 374
  Berlin Aero Plant Now Movie Studio.. 442
  Berlin to Have Aerial Mail... 876
  Builds Aircraft Larger Than Zeppelins. 194
  German Aviators Act as Spies for Bolsheviki ... 844
  German Firm Demonstrating Aeroplanes in Sweden ... 60
  Germans Give Up Giant Zeppelin ... 652
  German Types of Aeroplanes Approved 844
  Grants Prizes for Greater Security.... 480
  Has Successful Airship Company... 24
  Has 25 Air Transport Companies... 812
  International Aerodrome in Berlin.... 480
  Predict U. S.–Germany Aerial Service.. 737
  Surrender Airships L-64 and L-71 to British ... 780
  Swiss-German Convention 408, 442
Gilmore, Col. W. E., Defeated in Race from Washington to Central Park, L. I.... 505
  Glasses, Crystal-On, Fluid Being Manufactured to Keep Moisture from Glasses ... 802
Glidden, Major:
  Addresses Aero Club of Pittsburgh.... 641
  Photo of ... 641
  Returns to U. S. ... 505
Gliders, Man-Carrying Gliders, by John F. McMahon ... 161
Godowsky, Dagmar, and Jascha Heifetz, with Pilot E. H. Rogers (photo) ... 49
Goggles, Resistal Goggles Officially Approved by Underwriters Laboratories ... 708
Goldsworthy, Lt., To Start on Exhibition Tour with Mark M. Campbell ... 432
Goodyear Tire & Rubber Co.:
  Buys Naval Air Station at Akron.... 49
  Cotton Growing to be Supervised from Air on Plantation of ... 433
  Goodyear Establishes California Field.. 115
  Sells Blimps to Army ... 373
  To Establish Dirigible Passenger Service 397
Gran, Major Tryggve, Flew from London to Norway ... 684
Griffith, Leigh M. Personal Par. 13, 182
Group Illustrations:
  Anstead, Miss Mary, Col. C. DeF. Chandler, A. Leo Stevens, Col. Jacob Wuest ... 865
  Representing Sec'y Baker: Alan R. Hawley, Henry Woodhouse and Major Baldwin Davis, John P. and C. S. Jones of Curtiss Aeroplane & Motor Corp.; Col. Hickham ... 472
  Dooley, K. J., Mechanic; Ray Cullman, Pilot; Joseph Murphy with Curtiss Oriole in Which They Are Flying from New York to Tulsa, Okla... 333
  Holden, Capt. O. F.; C. E. Merrill; Clarence C. Coombs, Pilot and Howard Mingos in Front of Orenco "Tourister" in Which They Reached 16,200 Feet in 1 Hour ... 360
  Members of Crew to Man R-38... 261
  Morrow, Col. Joseph C.; Lt.-Col. Jacob W. S. Weresi, Pilot; Judge Kenesaw M. Landis; A. Leo Stevens, Just Before Recent Balloon Flight from Fort Omaha, Nebr. ... 295
  Official Luncheon at Hotel Ambassador May 22 of Army and Navy Officials and Delegates Attending Third Pan-American Aeronautic Congress ... 397
  Ovenden, Mark; Mayor Thomas S. Baldwin; John M. Larsen, Alan R. Hawley, Com. C. C. Witmer, A. D. Smith, Com. M. Ufgoff, Mr. Conklin and Bert Acosta, Pilot, Standing on Wing of JN-6 Monoplane... 471
  Ranza, Captain and Lt. Marzori Being Given a Cordial "Send Off" on Rome–Tokio Race ... 442
Groves, Air Com. Robert M., Killed in Egypt ... 480
Guidoni, Lt. Col. A., Photo of ... 369
Gulf States Aircraft Corp., Much Aerial Activity Carried on by... 360
Gyroscopic Compass, Test 17 lb. Compass in Aeroplane ... 227
Gyroscopic Instruments, Investigates for Aerial Navigation ... 227

H

Hall & Co., Frank B., Have Aircraft Insurance Department ... 217
Hall, Miss Henrietta, Christens L. W. F., U. S. Army Bombing Plane ... 433
Hallett, Maj. George E. A., Discusses Carbureters for Army Aviation Service.. 227
Hamilton, Lt. Arthur G., Dropped 20,900 Feet by Parachute ... 843
Hammond, Lee, Opens Chicago Office... 399
Handley-Page:
  And Brizilian Government Signed Contract for Service ... 684
  Biplane at Pekin-Aerial Transportation (photo) ... 193
  Extends Programme ... 228
  In India ... 620
  London–Paris and Brussels Aerial Services ... 296

PAGE

  - New Wing 296
  - Photo of 113
  - Record of Commercial Aeroplanes.... 374
  - Records 620
  - Revolutionaary Improvements in Aeroplane Construction Announced by... 80
  - Scale Model of Handley-Page Machine 92
  - Service Very Busy 516
  - Syndicate Aircraft Deal 334
- Handwerk, Lt. Morris C., To Return to U. S. From Duty in Germany...... 683
- Hangars:
  - Bids Asked for Twin Cities.......... 676
  - Mammoth Dirigible Hangar to House R-38 227
  - Navy to Have Hangar on Pacific Coast for Rigid Dirigible 397
  - Navy Dirigible Hangar to be Largest in World 683
  - New Airship Hangars Ready Soon.... 181
  - Plan Dirigible Hangar at San Diego.. 866
  - Reno Council Accepts Bid for Hangar 801
- Hanscom, C. D., With Glenn L. Martin Co.. 183
- Harris, Lt. H. R., In Tests for Aeroplane Attacks Upon Tanks 515
- Hartz, Col.:
  - Asks Senate Investigation of Conspiracy Against Him 540
  - To be in Charge of Operation of Air Lines 355
- Heddon Aviation Company Has Started Business in Dowagiac, Mich. (Illus. art) 769
- Heifetz, Jascha, With Dagmar Godowsky and Pilot E. H. Rogers (photo).. 49
- Helicopter, The Berliner.... 11
- Helium:
  - Army Helium Plant Moved to Langley Field 373
  - Helium Production by the Government 747
  - Tests Success in Canada.... 652
  - To Co-ordinate Helium Gas Activity... 91
  - U. S. Helium Plant Nearing Completion 115
- Hensley, Col. William, Tells of German Dirigible 91
- Hersey, Mayo D., "Aeronautic Instruments," by 403, 437
- Hickman, Pilot Archie S. Operating Aerial Service in Paris, Ill.......... 770
- Hill, L. Clayton, Personal Par. 399
- Hinkley, Lt., Starts Alone from London on Flight to Australia 480
- Holland:
  - Civil Aviation in 126
  - Develops Aviation Division 374
  - Establish New Dutch Aerodromes...... 194
  - Plan Dutch-Swiss Aerial Service 780
  - Progressive Dutch Policy 586
  - Prohibited Area in.... 780
- Holthouse, Lt., Average 109.90 Miles Per Hour on Flight in South Africa.... 552
- Honaman, R. K., "Methods of Meaasuring Resistance of Insulators at High Temperatures," by 806
- Hotel Astor, Plan Aeroplane Landing on Roof of 674
- Hunsaker, Commander J. C., Wright Memorial Address Made by.... 576
- Hunting, Aerial, Aerial Hunters Keep Away from Alberta 875
- Hurst Company:
  - Building New Machine 115
  - To Build Plant 676
- Hydro-Aeroplanes:
  - "Miss Toronto II" Launched 675
  - "Miss Toronto II" in Race with Canuck Training Plane 834
  - Plan for Aerial Service with 780
  - Plan to Market New Type of.... 812
  - Spad-Herbemont Machine Made Best Speed Record at Meet at Monaco (photo) 609
  - Used to Study Eclipse of Moon...... 285

I

- Index, Composite Index of Aerial Age..... 475
- India:
  - Aerial Advertising in 480
  - Aerial Mail Services in French Indo-China 552
  - "Daily Express" in £10,000 Indian Flight 552
  - Establish Permanent Aero Services in.. 748
  - Handley-Page in 620
  - Survey Aerial Routes in 296
- Indians:
  - An Indian and an Aeroplane at St. Challes, Manitoba, Canada, (photo).. 576
  - Take to Aviation 542
- Industrial Department:
  - Oakland, California 402
- Insignia, New Insignia for U. S. Marine Corps Aviation 747
- Instruments:
  - "Aeronautical Instruments," by ..403, 437
  - Bureau of Standards Conducting Experiments with Aeroplane Instruments 164
  - Complete Line Manufactured by Pioneer Instrument Co. 257
  - New Aviation Instrument 13
  - Official Collection of 834
- Insulators, "Methods of Measuring Resistance of Insulators at High Temperatures," by F. B. Silsbee and R. K. Honaman 806
- Insurance, Aircraft:
  - Covers Aerial Limousine 360
  - Grows 182
  - Hall, Frank B. & Co., Have Aircraft Insurance Department 217
  - In Canada 360
  - Offered by Chicago Company 13
  - Plans Aircraft Syndicate 82
  - Spain Shows Progressive Attitude Toward 320
- Interallied Aircraft Corporation:
  - Appoints Western Agent 217
  - Demonstrating the Maneuverability of Avros at Mitchel Field ..Cover May 10
  - Offers Free Trips 13
  - Statement by Mr. John Inwood, Manager, Regarding Patent Situation.... 640
- International Aerial Development Co., Reno Council Accepts Bid for Hangar from 801
- International Aerial Navigation Co., To Build Largest Flying Boat of Its Type in the World 801
- International Air Service Corp., Organized in Nogales, Ariz. 834
- International Aircraft Corp. Establishes Airport 250
- Inter-State Airplane Co. Buys Payne Field 287
- Inventions:
  - Marconi Device Aids Flying in Fog.. 114
  - Spanish Invention to Determine Position 92
- Investigations:
  - Bellinger, Com. and Col. Hartz Ask Senate Investigation of Conspiracy Against Them 504
  - Fatigue of Metals 326
  - Grand Jury Investigation of Manufacturers' Aircraft Association Requested 213, 607
  - National Safety Council to Investigate Aviation Hazards 706
  - "The Investigation of Aircraft Radiators at the Bureau of Standards," by S. R. Parsons 476, 511
  - U. S. Attorney General Requested by Congress to Recover Funds Fraudulently or Illegally Paid to Constructors 213
- Italy:
  - Airship Service 24
  - B-34 Taken Out for Flight in.........652
  - British Aviators to Receive Assistance on Italian Aerodromes 262
  - Civil Air Department Removed........ 716
  - Civilian Aircraft of 60
  - Entered Eighteen Machines for Competition at Antwerp 684
  - Fast Flying 194
  - Government Training Pilots 24
  - Italian Aviator Shot Down 296
  - Plans of Swiftest Aeroplanes Brought Here from Italy by Lt. Cesare Sabelli 674
  - Poland Orders from Italy.......... 480
  - "Seaplane Week" to be Held in........ 586
  - Sends Mail by Aeroplane to Offset Telegraph Strike 262
  - Three Aero Squadrons at Albania 228
  - Turin Exhibition Postponed 442
- Ives, Dr. Herbert E., Has Joined Fairchild Aerial Camera Corp. as Consulting Engineer 398

J

- Jacuzzi Brothers, Brochure on Aeroplane Propellers Prepared by 507
- James, W. S., "Variation of Horsepower with Altitude and Compression Ratio," by 54, 154
- Janin, Albert S., Decision Handed Down in Curtiss-Janin Suit 285
- Japan:
  - Establishes Air Service 125
  - Grows Keen Over Air Travel......... 516
  - Japanese Aeroplane Engines.......... 334
  - Japanese General Flies with American Officer 249
  - Japanese Mission on a Visit to England 194
  - New Japanese Aviation Records....... 780
  - Planning Two Aerial Meets 684
  - To Trade by Air 652
  - Wireless Phones Link Warships and Aeroplanes 716
- Japanese Air Service:
  - General G. Nagoka, Chief of, Now on Official Visit to U. S. (photo) 216
  - Makes Tokio–Seoul Flight 296
- Jeffrey Company, O. K., Plans New Aerial Line in Oregon 676
- Johnston Aviation Co. Operating Pittsburgh Airport 643
- Jones, Capt. Junius W., To Return to U. S. from Duty in Germany 683
- Jones, W. I., Inspetcor for Aetna Company 81
- Jordan, John A., To be in Charge of Operations of Air Lines 355
- Joyce, Temple N., To Build Morane Saulnier Planes in U. S. 868

K

- Keane, Horace:
  - Exhibits in Vanderbilt Hotel 11
  - With Doris Keane in an Ace (photo).. 150
- Keane, James L., To Return to U. S. from Duty in Germany 683
- Kelly, Capt. George, Killed in Poland.... 812
- Kelly, Lt. J. N., On Exhibition Tour 576
- Kelly, Lt. O. G., In Tests for Aeroplane Attacks Upon Tanks 515
- Kendrick, Col. William J., Made Director of Aircraft Production 373
- Kerber, L. V., "Preliminary Choice of a Wing Section," by 839
- Knabenshue, Harry Roy, Married 12

L

- La Cointe, Prof., Invented "Alerian" Aeroplane 249
- Landis, Judge K. M., Noted Jurist Makes Free Balloon Flight 215
- Landis, Reed G., With Critchfield & Co... 577
- Langley Memorial Aeronautical Laboratory:
  - Coffin, Dr. J. G., Flew to Attend Dedication of 506
  - Official Opening of 479
- Langley, Samuel P., Aircraft Tender to be Named 286
- Larrabee, Wilbur, Flies from New York to Minneapolis in 16½ Hours 770
- Larsen, J. M., Photo of 542
- Latham, Jean, New Type of Hydro-Aeroplane to be Marketed by 812
- Laws:
  - Drafted Covering Aviation in Scandinavia 442
  - New York Awaits Action of Federal Government for Aerial Laws 398
- Lawson Aeroplane Co. Has Issued Statement Showing Assets 543
- Lawson Airline:
  - Air Service Delayed 507
  - Company Enlarges Plant 287
  - To Operate in July 51
- Lea, Clarence F., Message Received at Third Pan-American Aero Congress from 430
- League of Nations and the Air 748
- Lecointe, Sadi:
  - Commercial Trial Flight Made by.... 716
  - Grand Prix de Monaco Awarded to.. 408
  - Official World Speed Record 326
- L'Ecole Aero, In Switzerland 876
- Lent, Major L. B., Flies from Washington to New York 380
- Leonard, Pilot K. L., Has Eventful Flight from Greenville, Miss., to Cincinnati, Ohio 611
- Lep-Aerial Travel Bureau:
  - Increase in Activities 480
  - New Leaflet on Aerial Touring Issued by 620
- Levy Aircraft Company, James; Asembly and Storage Room of Company in Chicago (photo) 287
- Lewis, Dr. Robert M., Surgeon Flies to Patients 398
- Lighthouse, Aerial, At Lille 126
- Lipton, Sir Thomas, Will See Cup Race from Seaplane 320
- Locklear, Lt. O. J., Obituary Notice 768
- Logan Aviation Co., Opens Flying Field.... 321
- Lott, E. P., Completed Tour from Great Lakes to the Gulf of Mexico, Then to New Jersey 642
- Lovell, John E., President of Aero Club of Chattanooga 472
- Luftschiffbau Zeppelin Co., High Officials of Company Arrive in New York 472

Mc

- McAtee, William A., Photo of 738
- McBee, Rev. Croswell, Views Parish from Air 472
- McCormick Motor Car Co. Are Curtiss Distributors at Williamsport, Pa. 834
- McGregor, Lt. Ian, Obituary 24
- McJimsey, E. E. E., Photo of 738
- McLaughlin, "Daredevil":
  - On Exhibition Tour.... 576
  - Performing One of His Latest Stunts (photo) 432
- McMahon, John F.:
  - A.R.O.G. 36" Model Tractor Monoplane (line drawing) 61
  - Caproni Biplane Model (line drawing) 195
  - Compressed Air Motors 297
  - Construction and Design of "Aviettes" 653, 685, 717, 749, 781 845
  - DH-4 Flying Scale Model (line drawings) 481
  - Formation of Model Aeroplane Club.. 876
  - Gasoline-Motored Model Aeroplane by.. 621
  - Illinois Model Aero Club News Bulletin 813
  - Illinois Model Aero Club Indoor Contests, Winter 813
  - Ithaca Aero Club—Fetters Biplane.... 375
  - Man-Carrying Gliders 161
  - Model for the Compressed Air Plant (line drawing) 587
  - Model Gliders (line drawing) 25
  - Models Built by Carl Fastje 813
  - New Model Club in Pittsburgh—Compressed Air Motors 443
  - Racing Type Flying Boat (line drawing) 409
  - R.O.G. Racing Model 517
  - Scale Model of Handley-Page 92
  - Seaplane Flying Model (line drawing) 263
  - Sopwith Triplane Model (line drawing) 229
  - Spad Model (line drawing) 335
  - Steam Engines (line drawing) 553
  - Wing Profiles 127

PAGE

- McNamara, John H., Personal Par. 182

M

- Machle, Lt. J. B., Tests Safety Suit 507
- Macomber and Whyte Rope Co., Now Macwhyte Co. 473
- Mandeville, J. B., "Aerial Photography as Applied to Topographical Surveys," by 87
- Maneyrol, Pilot, Flew from Paris to Rome 748
- Manly, Charles M., Personal Par 51
- Mann, Ralph H., Banker Buys Plane for Business 217
- Manufacturers' Aircraft Association:
  - Aeronautic Patents Situation 573, 638
  - Attorney General Asked to Investigate 213, 607
- Maps:
  - Aerial Photographic Maps of the Canal Zone 333
  - Commercial Map from Air to be Made by Rand-McNally Co. 801
  - Plan to Map New York by Aeroplane 706
  - To Map Out Aerial Routes 50
- Marconi, Device Aids Flying in Fog 114
- Marshall, R. C., Flew from Daytona, Fla., to Dayton, Ohio 642
  - Photo 676
- Martin, Knox, Flying in Columbia, Central America (photo) 368
- Marx, Harry J., Instructor for Aerial Police 398
- Maryland Pressed Steel Co., To Curtail Manufacturing Operations 398
- Marzari, Lt., Photo of 442
- Mead, George J., Personal Par 13
- Medals:
  - Distribute the Victory Medals 582
  - John Fritz Medal Awarded to Orville Wright 358
- Medical:
  - New Medical Tests for Flyers 615
  - Plan Aerial Medical Branch 193
- Meeker, Ezra:
  - Flies Over Trail He Covered with Ox Team 706
  - Photo of 769
- Meetings:
  - Aero Club of France Meeting at Buc 876
  - American Society of Mechanical Engineers Names Date of 1920 Annual Meeting 802
  - Special Meeting of Aero Club of America to be Held August 28th 810
  - "Uphold the Law, Foster Aeronautics," Key-note of Meeting of Aero Club of America 863
- Meets:
  - Japan Planning Two Aviation Meets 684
  - Plan State Aero Meet in St. Paul 706
- Memorials:
  - Plan Officers' Club and Memorial Hall in New York 683
  - Wright Memorial at Le Mans, France 262
- Memphis Aerial Co., Use of Aeroplanes Demonstrated by 287
- Manoher, Major Gen. Chas. T., Message Received at Third Pan-American Aero Congress from 396
- Mercury Aviation Co., to Use J. L. Monoplanes in Aerial Service 802
- Meteorological, Weather Bureau Requests Aerial Age to Collect Information 249
- Methods of Measuring Resistance of Insulators at High Temperatures, by F. B. Silsbee and R. K. Honaman 806
- Method of Navigating Aircraft (Illus. art) 647
- Metric, Congress May Pass New Metric Law 706
- Meyers, C. W., Completed Flying Tour from Great Lakes to Gulf of Mexico, then to New Jersey 642
- Meyerhoffer, Orvar, Obituary 738
- Michowski, Henry, Constructed Flying Scale Model of the DH-4 443
- Miller, Roy G., "Fuselage Stress Analysis," by 119
- Milwaukee Association of Commerce, Making Effort to Prevent Other Cities in U. S. from Inducing Lawson Aeroplane Co. to Move Away 543
- Mitchell, Charles E., Host of Aerial Party 609
- Models:
  - "Aviettes," Constructiton and Design of 653, 684, 717, 749, 781, 845
  - Caproni Biplane 195
  - Compressed Air Driven Engines 443, 587
  - Electric Motors in Aeroplanes 55
  - Fetters' Biplane (Illus. art) 375
  - Flying Boats, Racing Type 409
  - Gasoline-Motored Model Aeroplane 621
  - Loening Monoplane Constructed by Edw. R. Walker (photo) 517
  - Men Interested in 375
  - Model Gliders 25
  - R.O.G. Model 517
  - Seaplane Flying Model 263
  - Sopwith Triplane 229
  - Spad Model 335
- Monaco Meeting 92, 160, 408
- Monel for Engine Valves 331
- Monuments:
  - To Unveil Monument to Chavez 748
  - To Unveil Monument to Wright 641
- Mosaic:
  - Aerial Photographic Mosaic and Demonstration at Fort Leavenworth 683
  - Photographic Mosaic of Camp Bragg Completed 515

PAGE

- Motion Pictures:
  - "Aeroplane Displaces Automobile in," by Jerome Lachenbruch 53
  - To Make Movies of Hudson Bay with Seaplane 800
- Motorcycles, Aeroplane Wins Race with Motorcycle 769
- Mufflers, New Aeroplane Engine Muffler 331
- Mullen, Lt. John, Made a Flight in Balloon from Virginia to Staten Island 472
- Munter, Herbert A.:
  - Flies from Seattle, Washington to Spokane, Washington 643
  - Flies from Seattle, Washingon to Portland, Oregon 811
  - Flies 500 Miles in 90 Minutes 576
- Murray, Mae, Christens Curtiss Aero Ltd., No. 6 286

N

- Nagoka, Gen. Gaishi, On Official Visit to United States (photo) 216
- National Advisory Committee for Aeronautics:
  - French Competition for Peace-Time Aero Engines, Report Made by 509, 548
  - Methods of Measuring Resistance of Insulators at High Temperatures, Report Made by 806
  - Preliminary Report on Free-Flight Tests by Edw. P. Warner and F. H. Norton, Report Made by 545, 579, 649, 677
- National Aerial Photographic Survey Co.:
  - Airscape of Rhode Island State House, Photographer by Cover Aug. 2
  - Organized in Providence, R. I. 251
- National Airway Service Co.:
  - First Aeroplane of, Flown from Toronto, Canada, to Akron, Ohio 358
  - Organized 51
- National Safety Council to Investigate Aviation Hazards 706
- Navigation, Aerial:
  - Aeroplane Used as Aid to Navigation—Marine Chart Corrected from Aeroplane 747
  - Bill Would Create Air Navigation Commission 431
  - Civil Aerial Navigation in Spain 60
  - In France 812
  - Method of Navigating Aircraft 647
- On the Continent 24
- President's Bill Would Govern 358
- Regulations in France 812
- Navy Department:
  - Aeroplane-Carrier Langley Ready in January 875
  - Aeroplane Turret Take-Offs Successful 875
  - Air Detachment Commended 715
  - Army Permits Navy to Use Mitchel Field 551
  - Army Used Navy Planes for Panama 261
  - Dirigible Hangar to be Largest in World 683
  - Exhibit on Steel Pier, Atlantic City, 248, 401
  - Fifteen Torpedoplanes for U. S. Navy 715
  - Flying Station Now Proposed for Great Salt Lake 397
  - Line Officers in Aviation Class 407
  - Naval Flight from San Diego to Panama 875
  - Navy Balloon for International Race 651
  - Navy Department to Exhibit F5L at Atlantic City Cover May 3
  - Navy Dirigible to Make Non-Stop Flight 249
  - Navy Fliers May Use Mitchel Field 515
  - Navy Gets An All-Metal Seaplane 779
  - Orders Aircraft Engines from Packard Motor Car Co. 802
  - Planning Large Triplanes 59
  - Policy of Army and Navy Relating to Aircraft 91
  - Promotions in U. S. N. R. F. Flying Corps 373
  - Record Dirigible to be Built by 91
  - Seventy Navy Aviation Commissions Open 875
  - To Increase Lighter-Than-Air Activity 407
  - U. S. S. Harding Assigned to Air duty 875
  - U. S. S. Maryland, Navy's Latest Super-Dreadnaught Cover June 21
- Neal, Mr. and Mrs. Howard K., Take Aerial Honeymoon Over Texas (with photo) 675
- Nebraska Aircraft Corp., Photo of Plane with Marjorie Keene, Florence Jones and Pilot Sealer 91
- Netherwood, Major Douglas B., Reaches 27,000 Feet in DH-4-B 505
- New York City:
  - Airport Opened 541
  - Pass Bill for New York City to Give Land to U. S. for Aerial Stations 249
- New York Evening Post:
  - $250,000 Suit for Damages Started by Henry Woodhouse Against 471
- Noggle, Roy L., To be Officer in Charge of Aviation Field in Ogden, Utah 507
- Norma Company of America, Mr. Norman Bell Made Assistant Sales Manager of 708
- Norton, F. H., "Preliminary Report on Free-Flight Tests," by 545, 579, 649, 677
- Notes on the Theory of the Accelerometer, by E. P. Warner 681
- Nunn, Harry, On Exhibition Tour 576

O

- Oakley Aerial Esquadrille Giving Exhibitions 542

PAGE

- Oakley, Arthur, Transfers from Moving Train to Plane 286
- Officers:
  - Flying Status of Air Officers 91
  - Hospitals Open to Officers of Officers' Reserve Corps 747
  - Naval Officers to Fly Scout Planes 23
  - Reserve Officers to Receive Flying Training at Army Pilots' Schools 159
- Ohio Flying School and Transport Co., First Plane to Pass Through U. S. Aerial Customs 431
- Ohio Valley Aero-Transport Co. to Operate Air Line 507
- Olganoff, Eugenia, Taking Flying Lessons 832
- Optimist Club of Kansas City Held Meeting in Hangar of Commercial Airship Syndicate 505
- Outlook Windshield Cleaner (photo) 506
- Oxygen:
  - Heat Oxygen for Planes 326
  - Novel Test 82

P

- Pack, Charles, Personal Par. 13
- Packard, Harold A, To Return to U. S. from Duty in Germany 683
- Page, A., "Description of Apparatus for Measurement in Wind Tunnel of Performance of Airscrew or Windage Torque of Rotary Engine," by (Illus. art) 118
- Page, Senator Carroll S., Message Received at Third Pan-American Congress from 396
- Palmer, Lt. Frank:
  - Flew from Daytona, Fla., to Dayton, Ohio 642
  - Photo of 676
- Panama Canal:
  - Aerological Service at 706
  - Airscape of the Gatun Locks of the Cover Aug. 23
- Pan-American Aero Exchange Organized in Cincinnati, Ohio 577
- Panhandle Aerial Service and Transportation Company Reorganizes 321
- Parachutes:
  - Government Contracts for 149
  - May Drop Packages 262
  - New Type Devised by Walter T. Varney a Success 708
  - Pack Type Successful in Drag Jump at McCook Field 125
  - Plane Painted White 295
  - Record 20,900 Feet Parachute Drop 843
  - Second Class of Officers Graduated from Parachute Course at Kelly Field, Texas 373
  - Second Lt. John H. Wilson Leaps 19,800 Feet with 505
  - Sergt. Bottriell Sets Parachute Record 585
  - Supply Parachutes to Air Service Units 261
  - Testing Parachute While Plane Spins 333
- Parsons, Samuel R., "The Investigation of Aircraft Radiators at the Bureau of Standards," by 476, 511
- Pasadena Military Academy Students to Study Aeronautics 706
- Patents, Aero:
  - Aerial Illuminating Device for Use in Connection with Aircraft—H. E. S. Holt 436
  - Aeronautic Patents Situation—Editorial 573
  - Aeroplane and the Like—G. H. Ellithorpe 436
  - Aeroplane—Hartvig Sorley 259
  - Aeroplane-Propelling Device—N. L. Hyatt and H. Lloyd 556
  - Aeroplane Propeller—L. S. Barr 590
  - Aeroplane Protector—Nyky 331
  - Aeroplane—A. F. Ringstrom, Jr. 436
  - Aeroplane Safety Device—F. P. Sargent 556
  - Aeroplane—J. S. Spainhour 331
  - Aeroplane Structure—A. S. Janin 556
  - Aeroplane—J. Taneyhill 590
  - Aeroplane—W. I. Twombly, Assignor to D. S. Dodge 556
  - Air Navigation Machine—David McIntyre 436
  - Airship—H. L. Roderick and H. D. Newhart 436
  - Aviation Helmet—Joseph Paupa 259
  - Balloon—Maxim Zavarkin 331
  - Convertible Multiplane—J. P. Tarbox 590
  - Esnault-Pelterie Claim in France 876
  - Flying Machine—John Barto 556
  - Fuel Supply Pump for Aeroplane Engines and the Like—G. De Haviland and J. S. Chapman 590
  - Launching Mechanism for Aircraft—G. L. Cabot 259
  - Manufacturers Aircraft Association Misrepresents Patent Situation 638
  - Safety Attachment for Aeroplanes—P. R. Lea 436
  - Safety Suit for Aviators—W. Peterson 590
- Patrol, Aerial:
  - Aerial Forest Patrol Detects 45 Fires 683
  - Air Force to Patrol Mesopotamia Lines 60
  - Army to do Aeroplane Forest Fire Patrol 193
  - Churchill Proposes to Guard Mesopotamia by 126
  - Ninth Observation Squadron to be Used in California 585
- Peerless Flyers Corp. Exhibition Tour 610
- Persia, Openings for ex-Flying Officers and Men of R. A. F. in New Forces in 408

PAGE

Peru:
  Aerial Service in 24
  Develops Aviation 92
  Flying Boat Service for 24
  Much Aerial Activity in 620
Philadelphia Aero Service Corp.:
  Aircraft Factory Visited by Flying School of 577
  Elects Officers 217
  Has Anniversary 151
  Inspection Lineup at Flying Field of (photo) 433
  Makes Record Training Students 320
  Olganoff, Madame Eugenia, Taking Flying Lessons at School of 832
  Series of Experiments Covering Flying Ability of Fowls, Made by 250
  To Operate Branch on Country Estate .. 182
  To Start a Branch of Its Flying School 398
Photographic, Aerial:
  Aerial Photographic Mosaic and Demonstration at Fort Leavenworth 683
  Airscape of a Section of Coney Island .... Cover June 7
  Airscape of Chicago Showing Municipal Pier .... Cover July 12
  Airscape of Luna Park, Coney Island .... Cover, Aug. 30
  Airscape of Rhode Island State House .... Cover Aug. 2
  Airscape of the Chicago Freight Yards .... Cover Aug. 9
  Airscape of the Gatun Locks of the Panama Canal .... Cover Aug. 23
  Airscape of the Polo Grounds, New York, Taken from a Curtiss Oriole, ... Cover June 14
  Airscape of the U. S. Naval Aviation Station at Anacostia and Bolling Aviation Fields .... Cover July 19
  As Applied to Topographical Surveys (Illus. art) 87
  Convention Photographs Sent by Plane 619
  J L.-6 Monoplane Delivers Yacht Race Photos 706
  Made of Flooded Area—Dayton, Ohio. 373
  Mosaic of Camp Bragg Completed 515
  National Aerial Photographic Co. Organized in Providence, R. I. 251
  New Photographic Section 439
  Photographing Haiti's Coast Line with Aeroplane 768
  Photographic Lens Dropped from the Air 585
  To photograph Coast Line from Dirigible 515
Piccio, Lt. Col. Pier Ruggero, Announcement of Marriage 575
Picnic, Aerial:
  Aerial Club of Buffalo Holds 865
  First Aerial Picnic in U. S. to be Held in Hammondsport, N. Y. 769
  Held by Employees of Messrs. Macdonald, Syer & Co., Ltd., England .. 748
Pillon, Ed., Won Second Place in French Speed Range Competition 812
Pilots:
  15,576 Pilots in France 160
  Former Pilots of Rockwell Field Can Obtain Pilot Books 373
  List of Licensed Pilots 812
  Name Pilots to Race American Planes 768
  Observing Training for Aeroplane Pilots 261
  To Guide Aerial Mail Pilots with Searchlights 322
  Training of Reserve Pilots in France .. 620
Pine Valley Flying Field, Opening of .. 507, 609
Pioneer Instrument Co.:
  Imports Badin Indicators 834
  Producing Complete Line of Navigational and Flight Instruments (photos) 257
Plimpton, R. E., Joins Wales Advertising Company 399
Poland:
  American Aviators with Poles Sink Red Monitor 552
  Orders from Italy 480
  U. S. Flyers Shot Down in 812
Police, Aerial:
  Benefit for 575
  Marx, Harry J., Technical Instructor for 398
  New York Aerial Police at Yacht Race 706
  Ohio Plans for 149
  To Carry Tear Bombs 706
Police, State, Are Planning to Use Aeroplanes 674
Pollock, Major G. A., Returns to U. S. with Salmson Plane (photo) 113, 149
Pomilio, Allesandro; Returns to U. S. 215
Post Office Department:
  Celebrates Second Anniversary 380
  Issues Call for Proposals for Operation of Aerial Mail Routes 644
  To Award Aerial Mail-Carrying Contracts 430
Potter, Mrs. H. R., Owner of Oriole Shown at Automobile Show, Madison, Wis. (photo of machine) 543
Prizes:
  Aerial Prizes in France 480
  Bleriot Safety Prize 480
  Farman G.L.-41 Wins Grand Prize of Monaco 516
  Farman Two-Passenger Sport Plane Wins Grand Prize 708
  Germans Grant Prizes for Greater Security 480
  "Grand Ecart" Prize Won by Bossoutrot 812
  Grand Prize de Monaco Awarded to Sadi Lecointe 408
  100,000 Francs in Prizes for Aeroplane Safety Features 10
  Prize for Variation in Speed 160
Propellers:
  Bakelite Propeller Put to Severe Test .. 150
  Jacuzzi Bros. Has Prepared Brochure on Aeroplane Propellers 507
  Variable Pitch Propellers for Training Planes 843
  Warping 259
Protocol to International Air Convention .. 684

R

Races:
  Aero Club Announces Entries for Balloon Race 609
  Aeroplane Wins Race with Motorcycle .. 769
  Air Races in 1920—Royal Aero Club ... 262
  American Planes Go Abroad for Race .. 832
  Army to Participate in the Gordon Bennett Cup Race 747
  Army's Entry in International Balloon Race Christened 865
  At Opening of Pine Valley Flying Field 609
  Balloon Race Halted Again 832
  Cities Offer Cash to Contestants in Trans-continental Race for Pulitzer Trophy 768
  Cross-Country Race at Bournemouth 334
  Cup Racer Flies 223 Miles an Hour at Trials 865
  Dayton-Wright Monoplane Entry in Gordon Bennett Cup Race (photo) 832
  Draw Plans for Trans-Continental Race 736
  Entries for Second Trans-continental Race 800
  Gordon Bennett Cup Race, Prepare for 516
  Gordon Bennett Cup Race to be Important Event 262
  History of Gordon Bennett Racer 881
  J.L. Planes View Yacht Races 674
  Lipton, Sir Thomas, Will See Cup Race from Seaplane 320
  List of Entries for National Balloon Race Announced 737
  Name Pilots to Fly Aeroplanes in International Aeroplane Race in France .. 768
  Name U. S. Entries for International Air Race 641
  Navy Balloon for International Race .. 651
  Navy Balloons Race in Blizzard 11
  Plan Second Trans-continental National Race 769
  Plans for Balloon Races at Indianapolis Halted 768
Race for Flying Boats in Spain 194
  Transfer Balloon Races to Chicago 800
  To Hold Air Race Over Washington, D. C. 319
  U. S. Army's Entry in Gordon Bennett International Aeroplane Race (photo) 833
  View Yacht Races from Air 674
Radio:
  Commercial Talk Held with Aeroplane by 832
  Equipment for Seaplanes 868
  New Radio Trucks Will Soon be Given Trials 125
  Pilots Check in by Radio Every Five Minutes 615
  Seaplane Flies by Radio Compass 683
  Warns Mail Plane 610
Rand-McNally Co., To Make Commercial Map from Air 801
Ranza, Capt., Photo of 442
Ratings Issued to Discharged Aviators 261
Raynham, F. P., Made New Speed Record of 161 Miles Per Hour with Martinsyde 652
Read, Lt. Commander, Official World Speed Record 326
Records:
  Aeroplane Carrying Four Ascends 17,100 Feet 358
  Altitude Record Sought by Army Air Service 373
  Aviator Fronval Loops the Loop 962 Times Over Paris 516
  Aviators Making Records at Rich Field 29
  Bottriell, Sergt., Sets Parachute Record 585
  Bromwell, Miss, Makes Record of 87 Loops 800
  Cup Racer Flies 223 Miles an Hour at Trials 865
  Curtiss "Wasp" Seaplane Established New Navy Speed Record 431
  Favier, Louis, Breaks World's Altitude Record 652
  French Aviatrix Reached Altitude of 4,800 Metres 844
  French Flyer Makes Record 262
  Girl Makes 25 Consecutive Loops 150
  Goliath Broke World's Record for Continuous Flight 471
  Handley-Page Records 374, 620
  Handley-Page Plane Rises 13,999 Feet with 3,600 Pounds 308, 480
  Mail Plane at 16,000 Feet Breaks Record for Trip 544
  Makes Record in Paris–Lyons Flight ... 194
  Netherwood, Major Douglas B., Reaches 27,000 Feet in DH-4-B 505
  New Aeroplane Speed Record 11
  New Japanese Aviation Records 780
  New Martinsyde Speed Record of 161 Miles Per Hour 652
  New Records and Performances Officially Recognized 326
  New Six-Passenger Record Made by Larsen All-Metal Monoplane 431
  Of Civil Aviation 780
  Orenco Four-Seater Plane Climbs 16,200 Feet 319
  Record 20,900 Feet Parachute Drop .. 843
  Record Weather Balloon Ascent 652
  Schroeder, Major R. W., Makes Altitude Flight of 33,000 Feet 431
  70,000 Passengers Record of First Year of Civil Flying in England 812
  Seaplane Establishes New Record at Miami 113
  Swedish Height Record 160
  Tucker, Harrison R., Makes Record Flight with Farman "Tourabout" .. 575
  Unofficial Height Record of 18,200 Feet 432
  Von Segebaden, Lt. G., Makes Altitude Record 586
  Whelan, Pilot B. L., Set New Pilot and 3-Passenger Unofficial Height Record of 18,200 Feet 432
  Wilson, 2nd Lt. John H., Leaps 19,800 Feet with Parachute and Breaks Record for Altitude in a Parachute Jump 505
Reports:
  British Advisory Committee Reports .. 442
  Of Latest Congressional Investigation of Billion-Dollar Aircraft Expenditures, 58, 89, 124, 158, 192, 226, 260, 294, 332, 372, 406, 448, 514, 550, 584, 618, 656, 752 779
  On Aircraft Surveys 221
  Preliminary Report on Free-Flight Tests 545, 579, 649 677
Riano, Hon. Juan, Message Received at Third Pan-American Congress from. 395
Ricci Brothers Have Made Tests of Smallest Triplane 480
Rickenbacker, Eddie, His Spad Acquired by Chanute Field 125
Rinehart, Howard M.:
  Photo of 182
  To Fly in International Aeroplane Race 768
Robbins, Walter C., Personal Par 433
Roe, A. V., & Co., Has Been Unified with Crossley Co. 543
Roget, Lt.:
  Arrived at Athens 812
  Begins Around Europe Trip 586
  Flew from Lemberg to Bucharest 748
  Flew from Paris to Warsaw 552
  Official World Speed Record 326
Rohlf, Roland:
  Curtiss "Wasp" Seaplane Which Established New Navy Speed Record, Piloted by 431
  Official World Speed Record 326
  Photo of, with "Texas Wildcat" 736
  To Fly in International Aeroplane Race 768
Rorison, Lt. Harmon C., U. S. Pilot in Kosciusko Squadron 442
Rouse, Lt., Now Flying for Flagg Aeroplane Company 770
Routes, Aerial:
  France Lays Plans for 60, 160
  Needed in Andes 620
  Plan Network of Aerial Routes in France 126
  Post Office Department Issues Call for Proposals for Operation of Aerial Mail Routes 644
Royal Aero Club, Air Races in 1920 262
Rules and Regulations:
  Aerial Navigation Regulations in France 812
  For 1920 International Aviation Trophy Provide for Factor of Safety 9
  To Change Pulitzer Trophy Race Rules 832
Runser, Lt., Circumaviating America in an Avro (with photo) 474

S

Sabelli, Lt. Cesare, Arrives Here from Italy with Plans of Swiftest Biplane 674
Sanders, Warren, Photo of 738
Schmidt, E. "Duralumin" by (Illus. art) ... 772
Schools, Aviation:
  Air Service Schools Prove Successful .. 479
  Army Air Service Engineering School .. 21
  Aviation School at Pueblo, Colo. 833
  Brazil Military Flying School Active .. 780
  British Civilian Aviation Mission to Start Course of Instruction at Military Aero School at Palermo in Argentina 716
  Curtiss to Commence Instructions 250
  Establish Special Air Service Schools .. 619
  Evening Aeronautic Courses at New York City College 543
  Flying School Started by Los Angeles Y. M. C. A. 833
  Flying School Visits Aircraft Factory .. 577
  Foreign Officers to Attend U. S. Air Service Schools 866
  Great Lakes Has Large Aviation School 779
  Harvard Plans Course for Aviators ... 575
  Italian School in Argentina 54
  Kiln-Drying Course at Forest Products Laboratory 321
  May Have Aviation School at Watertown, N. Y. 577
  Military Flying School in Argentina .. 296
  New Policy Relative to Air Service Observation School 373

PAGE
  New Class to Start at Pilots' School, March Field ... 515
  Officers Taking Course for Aeronautical Engineers ... 295
  Open Ohio Flying School ... 83
  Philadelphia Aero Service Corp. to Start Branch School ... 398
  Photographic School — Langley Field, Virginia ... 193
  School at Kelly Field to Teach Parachute Jumping ... 23
  Thompson Aeroplane Company Establishes School ... 13
  To Open Aviation School in Spokane.. 866
  To Open in Vermont ... 51
Schools, Balloon:
  Assigned to ... 91
  Second Class of Officers Graduated from Parachute School at Kelly Field, Texas ... 373
Schroeder, Major R. W.:
  Air Service U. S. A. Aeroplane in International Air Race to be Piloted by 641
  Calibration of Barographs Used by ... 473
  Fit for New Altitude Test ... 286
  Official Altitutde Flight 33,000 Feet.... 431
  Official World Speed Record... 326
  To Fly in International Aeroplane Race 768
Scott, Wisner Gillette, Executive Secretary of Inyo Good Road Club Wants Aeroplane Landing Field Along Pacific Coast ... 800
Screens, Navy Smoke Screens for Air Bombs ... 875
Screws, New Air Screw ... 408
Seaplanes:
  Aeromarine F5L Navy Cruiser Christened by Governor Edwards (with photo) ... 575
  Classed as Ships in France... 586
  Coast Guard Gets Life Saving Seaplane 811
  Dornier Metal Seaplane, Equipped with Two 260 H.P. Maybeck Engines, etc. (photo) ... 439
  F5L Navy Department, Will Exhibit at Atlantic City ...Cover May 3
  First Seaplane Used in Transportation Service Reached Detroit ... 802
  Flies by Radio Compass ... 683
  Flies from Miami, Fla., to New York City in 15 Hours 35 Minutes ... 285
  Flying Popular at New Castle ... 641
  For Whaling ... 516
  Lipton, Sir Thomas, Will See Cup Race from Seaplane ... 320
  NC Seaplanes for Fleet Operations.... 875
  Navy Gets an All-Metal Seaplane..... 779
  New Navy Planes Tried Out... 114
  Radio Equipment for... 868
  Record Flight of Navy Seaplanes... 715
  Seaplane Flying Model... 263
  To Be Used in Lumber Service... 706
  Views of Twin Motor F5L... 248
  Will Bomb Battleship Indiana... 875
Searchlights, To Guide Aerial Mail Pilots with ... 322
Senate:
  Committee Increases Aviation Allowance ... 181
  Provides $25,000,000 for Naval Aviation ... 285
Show Flyers:
  Fly from Port Richmond, S. I., to Danbury, Conn., in 55 Minutes ... 505
  Have Been Doing Much Flying in Staten Island ... 472
Shaw, Lt. G. W., Forms Flying Circus... 215
Sheppard, Senator Morris, Received Message at Third Pan-American Congress from ... 396
Shooting, Aerial, at Rifle Meet... 683
Shows, Aeronautic:
  Avro Planes Arrived in San Francisco for Show ... 217
  Ohio Outdoor Aero Show a Success, 215, 676
  Olympic Aero Show Announced 296, 552
  Oriole Shown at Automobile Show,-Madison, Wis. (photo) ... 543
Shroyer, Mrs. Annette, 80 Years Old Makes First Aerial Trip ... 675
Signals, Aircraft Distress Signals ... 684
Signal Reserve Corps, Total Number of Officers Commissioned in ... 479
Silencers for Aeros Invented by Swiss.... 708
Silsbee, F. B., "Methods of Measuring Resistance of Insulators at High Temperatures," by ... 806
Simmons Hardware Co., Curtiss Oriole Used by, to Advertise "Keen Kutter" products ... 151
Simonds, Jr., Francis May, To be Married to Miss Marion Carey Dinsmore..... 866
Simpson & Tregilles to Manufacture Aircraft and Supplies in Australia 507
Slaughter, Frank, Operating Aerial Service in Paris, Ill. ... 770
Slocum, S. E., Ph.D., "Determination of the Pressure Law for Wing Surfaces," by.. 188
Smith, Lt. Chas. Edw. K., Anxious to be First Man to Fly Across Pacific Ocean 506
Smith, Capt. Lowell H., Aeroplane Carrying Four Ascends 17,100 Feet, Piloted by ... 358
Snook, Miss Neta, Took Her Mother for a Flight (photo) ...506, 800
Southern Aeroplane Co. Conducts Landing Tests ... 770
Spain:
  Commences Aerial Mail in ... 262

PAGE
  Race for Flying Boats in ... 194
  Shows Progressive Attitude Toward Aeronautics ... 320
  Spanish Air Lines Fixed ... 586
Spicer, M. A., "The Wisenant Longitudinal Aeroplane," by ... 804
Spokane Aviation Co., Has Complete Equipment tor Aerial Work ... 360
Sprunt, James M., Flies 750 Miles in 10 Hours (photo) ... 802
Stanley, Augustus O., Message Received at Third Pan-American Congress from.. 396
State Forestry Department Planning to Use Aeroplanes to Map Certain Forest Areas ... 674
Stations, Aerial:
  Ashmusen Aero Co., Service Station Established at Omaha ... 706
  Fredericton to be on Halifax-Montreal Run ... 868
  Seattle to Have Large Aviation Station 866
  Start Work on Aerial Defense Station on Pacific Coast ... 715
Stehlin, Lt. Col. Jos. C.:
  To Fight Bolsheviki ... 149
  To Recruit Flyers to Fight with Leets 333
Stout Engineering Laboratories Awarded Contract for Six Torpedoplanes for U. S. N. ... 715
Strauss & Buegeleisen, Resistal Goggles Officially Approved by Underwriters Laboratories, Manufactured by 708
Structural Analysis and Design of the Aeroplane by B. C. Boulton, 710, 742, 775
Suavely, Pilot Ralph (photo of) ... 738
Sunbeam Co., and Darracq-Talbot Merge.. 652
Superior Fliers Aircraft Co. Photos of Pilots ... 250
Surveying, Aerial:
  Aerial Photography as Applied to Topographical Surveys by J. B. Mandeville ... 87
  Indian Aerial Routes ... 60
  Report on Aircraft Surveys ... 221
  Survey Aerial Routes in India ... 296
Sweden:
  Savoia Flying Boats for ... 780
  Von Segebaden, Lt. G., Makes Altitude Record in ... 586
  Swedish-Finnish Aerial Service Started 516
Swiss:
  Government Encourages Aviation 374
  Plan Franco-Swiss Aerial Service.... 780
  Plan Dutch-Swiss Aerial Service...... 780
  Swiss-German Convention 408, 442
  Warns Swiss Not to Buy Aeroplanes of Germans ... 780
Switzerland:
  Aviation in ... 60
  New Official Aerodrome at Lausanne.. 262
  Notice of Civil Flying in... 296
  Regulate Aerobatics in ... 876
  Stunting in ... 812
  Work of l'Ecole Aero in ... 876
Symons-Russell Co.:
  Active ... 12
  Changes Personnel ... 611
  Establishes Aerial Service at Spokane.. 321
  Two Carloads of New Curtiss Standard Aeroplanes Received by... 473
Syracuse Aero Corporation Has Taken Over Aero Club of Syracuse... 399

T

Taddeoli, Emile, Obituary ... 620
Takikawa, Lt., Reached Height of 6,000 Metres—Japanese Height Record.... 780
Tavener, Charles H.; To go in Consulting Engineering ... 183
Taylor, A. H., Radio Compass Guides Aeroplanes in Air Under Direction of.... 450
Taylor, C. F., Personal Par. ... 779
Terhune, Edward A., Jr., Made Honeymoon Trip by Air ... 397
Tests:
  Armored Plane for Ground "Straffing".. 479
  Army to Test Metal Planes ... 295
  Camera to Test Sky Light... 320
  Conducted by Southern Aeroplane Co... 770
  Engineering Division Have a New Test Furnace ... 619
  Fireproof Dope Test ... 431
  Heat Oxygen for Planes... 326
  Helium Tests Succeed in Canada... 652
  New Aircraft Gun to be Given Tests.. 215
  New Bristol "Pulman" ... 194
  New Medical Tests for Flyers... 615
  Preliminary Report on Free Flight Tests, ...545, 615, 649, 677
  Schroeder, Major, Fit for New Altitude Test ... 286
  Tests of Fokker Aeroplane Chassis..... 627
  Tests for Aeroplane Attacks Upon Tanks ... 515
  Testing Parachute While Plane Spins.. 333
Thomas, Holt, Resigns from Airco... 194
Thomas, W. T., "Wave Soaring," by.... 616
Titanine, Inc., Expands ...473, 738
Titterington, M. M., with Pioneer Instrument Co. ... 83
Torpedoplanes:
  15 Torpedoplanes for U. S. Navy...... 715
  French Devise Aerial Torpedoes Guided by Shepard Plane ... 844
  Glenn L. Martin Torpedoplane (Illus. art) ... 366

PAGE
  Navy, Under Tests ... 50
Tournament:
  First Annual Air Tournament at Bolling Field ... 439
  To Golf Links by Air at Scotch Tournament ... 552
Tours:
  Aerial Honeymoon ... 320
  Aerial Tours in England... 194
  Aerial Touring Leaflet Issued by Lep Aerial Travel Bureau ... 620
  Gaubert, Louis, Makes Tour in Farman Tourabout ... 329
  Impressions of an Aerial Tour in America ... 508
  McLaughlin and Kelly on Exhibition Tour ... 576
Townley, A. C.: First to Use Aeroplane in Politics ...397, 542
Training:
  Air Service to Train Civilians in Flying, 193
  British to Train U. S. Airship Pilots.... 193
  Flying Training for Ground Officers.. 261
  New French Airships for Training...... 296
  Observer Training for Aeroplane Pilots 261
  Of Naval Reserve Flying Corps to Begin ... 479
  Philadelphia Aero-Service Corporation Makes Record Training Students.... 320
  Reserve Officers Not to be Called for Training in 1920 ... 261
  Training of Reserve Pilots in France.. 620
Transportation—Air Lines:
  Aerial Service in the Congo... 296
  Aeroplane Communication in the Adriatic ... 334
  Air Services from Brussels ... 334
  Aerial Taxicab Companies Form in Canada ... 358
  Aerial Express Co. Announces Gigantic Program of Seaplane Lines... 359
  Aerial Post in Belgium... 408
  Aerial Service at Asbury Park, N. J... 397
  Aerial Service in Aurora, Ill... 507
  Aero Service Between Australia and New Zealand ... 552
  Aero Service Between Sea Bright and New York ... 708
  Aero Service Between Toulouse, France, and Montpelier, Italy... 716
  Aerial Service in Brazil to Start Soon.. 684
  Aerial Service Between Los Angeles and San Diego Started by Mercury Aviation Company ... 802
  Aerial Service Started in Paris, Ill..... 770
  Aerial Service Started by Waterloo Aero Transportation Co. ... 738
  Aerial Lines Across Europe ... 844
  Aerial Service to be Started in Iceland. 876
  Another London–Paris Service ... 408
  Commercial Airship to Start on Regular Route ... 433
  Conn. Aerial Navigating Co. Operating Flying Boats ... 507
  Concord Aircraft Corp. Successfully Operating Aerial Lines... 769
  Danish Companies Plan Aerial Service Between Copenhagen and Warnemunde, Germany ... 334
  France Plans Air Service to Her Colonies ... 374
  $15,000,000 for Aerial Express... 430
  Flying Boat Service in Bermuda... 408
  First Regular Air Service Commenced Between London and Amsterdam.... 374
  French Civil Air Routes... 296
  Franco-Roumanian Flying Company Established ... 812
  First Seaplane Used in Transportation Service Reached Detroit... 802
  Gulf States Aircraft Co. Active...... 360
  Geneva to Paris in 3 Hours 15 Minutes 652
  Germany Has 25 Air Transport Companies ... 812
  Handley-Page London, Paris and Brussels Air Services...296, 334, 442
  Handley-Page Service Very Busy...... 516
  Hull of Cuba–West Indies Airways Flying Boat (photo) ... 13
  Increase Aerial Tourist Lines in France ... 552
  London–Amsterdam Air Service Started 552
  New Aeroplane Service in Norway.... 296
  North Sea Aerial Navigating Co., Ltd., Operating Aerial Service Between England and Holland ... 779
  New Service Started Paris–Brussels and Paris-Geneva ...748, 876
  Network of Air Services in Europe.... 876
  Ohio Air Line to Start ... 507
  O. K. Jeffrey Co. Plan New Aerial Line in Oregon ... 676
  Paris Aerial Services Improved ... 516
  Plan Aerial Routes Between Hawaii and California ... 505
  Paris–Prague Aerial Service Ready.... 442
  Predict U. S.–Germany Aerial Service.. 737
  Plan Berlin–San Francisco Airship Line. 865
  Plan Fifty-Hour Aeroplane Service Across Canada ... 833
  Paris–Cobourg Aerial Service... 876
  Start Seattle–Alaska Aerial Service in July ... 471
  Spain to France Air Service Inaugurated ... 620
  Spanish Air Lines Fixed ... 586
  Service Between Key West and Porto Rico ... 541

PAGE

  - Swedish-Finnish Aerial Service Started 516
  - Symons-Russell Aviation Co. Establishes Aerial Service at Sponkane.... 321
  - Service Between Paris–Athens Three Days a Week 684
  - Survey Aerial Routes in India........ 296
  - Traffic on French Air Lines........... 586
  - Western Air Line Syndicate Plans Aerial Service 321
- Transportation—Commercial:
  - Airship Service to Norway 194
  - Aviation Company for Hongkong 262
  - Aeroplanes in Arizona to Transport Freight 398
  - Air Trunk Lines to Transport Freight.. 398
  - Establishes Commercial Aerial Service Between France and Morocco 60
  - France Using Many Aircraft in Trade.. 296
  - Handley Page London, Paris and Brussels Aerial Services 296
  - Handley Page Extends Programme 228
  - Japan to Trade by Air.............. 652
  - Leeds to Holland Service............. 160
  - Lower Rates in England for Aerial Service 24
  - Mails by Air in China................ 480
  - Montreal–New York Air Line 620
  - Peru and Commercial Aviation 748
  - Plan Aerial Freight Line 81
  - Plan Extensive Aerial Service in France 160
  - Plan Dutch-Swiss Service........... 780
  - Plan Franco-Swiss Service 780
  - Propose Blimp Trans-continental Mail Service 801
  - Promote Swedish Air Lines.......... 160
  - Six Vickers-Vimy Machines for Transport Service 586
  - U. S. Aerial Express Service Started on Great Lakes 182
- Transportation—Passenger:
  - Aerial Service Between Paris and Warsaw 194
  - Aviation Co. for Hongkong 262
  - Avignon–Nice Aerial Service......... 92
  - Aerial Lines Planned to Atlantic City.. 215
  - Aerial Service in Paris, Ill., Started.... 770
  - Aeroplane Service in Finger Lake Region 609
  - Aero Limited Carried 407 Passengers in June 641
  - Aerial Passenger Line at Newport, R. I. 641
  - Aerial Service Between New York and Atlantic City 675
  - Aerial Service Between Los Angeles and San Francisco 676
  - Aero Ltd. Has Inaugurated Service from New York to Boston 505
  - Aero Service at New Brunswick, N. J. Active 541
  - Aero Service Established at Lake Placid 575
  - Bayonne-Bilboa Service Started........ 748
  - Columbia Seaplane Service........... 228
  - France Using Many Aircraft in Trade.. 296
  - First Inter-City Aerial Service for Passengers 399
  - Florida–Havana Aero Service Opens.. 13
  - Flagg Aeroplane Co. Starts Night Passenger-Carrying Flights 770
  - Flying Boat Service Started by Finger Lakes Air Line Corp. 738
  - First Trip of Air Line Between San Francisco and Los Angeles 506
  - Goodyear to Establish First Dirigible Passenger Service in U. S. 397
  - Handley Page London, Paris and Brussels Aerial Services 60, 296
  - Handley Page Extends Programme...... 228
  - Increase Aerial Tourist Lines in France 552
  - London–Nice Route 126
  - Miami and New York to Have........ 150
  - New London–Paris Service............ 126
  - New Aerial Service Between France and Spain 194
  - Plan Spokane, Washington - Lewiston, Idaho, Aero Service 577
  - Seaplane Record 52
  - Paris–Geneva Service 876
- Trophies:
  - Aero Club of France Has Awarded Leon-Morane Challenge Trophy to Jean Casale 684
  - Cities Offer Cash to Contesttants in Trans-continental Race for Pulitzer Trophy 768
  - Entries for Second Trans-continental Race for Pulitzer Trophy 800
  - Gordon Bennett Aviation Trophy 829
  - $1,000 "Aviette" Challenge Trophy Offered by Aerial League of America 325
  - Pulitzer Trophy Spurs Civic Bodies .. 800
  - To Change Pulitzer Trophy Race Rules 832
- Tucker, Harrison R.:
  - Flies 750 Miles in 10 Hours........... 802
  - Makes Record Flight with Farman "Tourabout" 575
- Turner, K. M., Elected President of Aero Club of Southern California......432, 472
- Turner, Lt., Circumaviating America in an Avro (with photo) 474

U

- Unger, E, "Duralumin" (Illus. art) 772
- United Aircraft Engineering Corp., In Action Against Curtiss Aeroplane and Motor Corporation 574

PAGE

- U. S. Aerial Express Co.:
  - Announces Gigantic Program of Seaplane Lines 359
  - First Seaplane Used in Transportation Service by, Reached Detroit........ 802
  - Service to Start 675
  - Views of Passenger Cruisers.......... 642
- U. S. Aircraft Corp. Purchases Lincoln Standard Planes 360
- Upson, Ralph H., To Represent Akron, Ohio, in National Balloon Race...... 770
- Uses:
  - Advertising and Selling by Aeroplane.. 151
  - Aerial Paper Delivery............... 11
  - Aeroplane Carries Grouse to London from Highlands 844
  - Aeroplane Carries Food in Mesopotamia 844
  - Aeroplanes Carry Injured Officer to Hospital 373
  - Aeroplane Delivers Motion Picture Films 433
  - Aeroplane Detects 17 of 19 Fires 833
  - Aeroplane Takes Pony to Play in Polo Game 844
  - Aeroplane to Inspect Power Lines 542
  - Aeroplane Used for Routing Grain ... 433
  - Aviators Discover New Lake in Panama 585
  - As Municipal Vehicle to Carry Pay Roll 251
  - Banks to Use Air Seervice........... 643
  - Business Men Find Aeroplane Reaches Destination Hours Ahead of Fast Train 716
  - Chinese to Detect Smugglers by Aeroplane 334
  - Cotton Growing to be Supervised from Air 433
  - Demonstrations of Commercial Uses Made by Memphis Aerial Co. 287
  - de Lysle, John, Flees by Aeroplane to elude Scotland Yard 748
  - Diamonds Sent by Air 684
  - Dispersing the Sudanese by Aeroplanes 160
  - Farm Commuting by Aeroplane 183
  - Farman Planes Carry Mail During French Rail Strike 322
  - Former Air Service Pilots on Barnstorming Tour 834
  - Interesting Air Cargoes 620
  - Inspect Timber Land by Aeroplane.. 865
  - Locate by Aeroplane Body of Drowned Man 768
  - Makes Delivery of Windows by Air.... 251
  - Marine Chart Corrected from Aeroplane 747
  - Mediæval Battle Gage Sent via Aeroplane 748
  - Meets Wrestling Engagements by Plane. 11
  - Navy Planes Spotting for Fish........ 651
  - New York Papers Delivered to Alaska by Planes 866
  - New York Times Delivered by Aeroplane in Chicago on Day of Issue.. 506
  - Paid Off from Aeroplane 29
  - Photographing Haiti's Coast Line with Aeroplanes 768
  - Plan Whale Hunting from a Baloon.... 833
  - Prisoner Flies to Jail Strapped Beside Sheriff 150
  - Regular Delivery of Newspapers by Plane 768
  - Sanitary Officers Use Plane to Locate Insect Breeding Places.............. 29
  - Seaplanes to be Used in Lumber Service 706
  - Ship Jewels from London to Paris by Aeroplane 334
  - Ship Paint from Factory 251
  - State Forestry Department Planning to Use Aeroplanes to Map Certain Forest Areas 674
  - State Police Planning to Use Aeroplanes 674
  - Surgeon Flies to Patients............. 298
  - To Aid Salvation Army Drive......... 249
  - To Carry Bank Notes................ 217
  - To Deliver Bees by Air in Canada..... 586
  - To Deliver Food by Aeroplane........ 115
  - To Make Movies of Hudson Bay with Seaplane 800
  - To Use Aeroplane for Mine Rescue Work 833
  - Townley, A. C., To Use Aeroplane in Campaign 397
  - Two HS-2 L Flying Boats Used to Carry Grapefruit 675
  - Use Hydro-Aeroplane to Study Eclipse of Moon 285
  - Use Aeroplane in Politics 542
  - View Real Estate from Air 114
  - Will Hunt with Planes.............. 586

V

- Valentine Gephart, Ltd., Has New Factory, 473
- Valves, Monel for Engine 331
- Voisin, Georges, Consulting Dope Expert.... 287
- Von Segebaden, Lt. G., Altitude Record of 6,200 Metres in 48 Minutes......... 586

W

- Wadsworth, Jr., Senator James W.:
  - Message Received at Third Pan-Ameri- Congress from 396
  - Photo of 866
- Walen, E. D., "Fabric Fastenings," by .. 474

PAGE

- Walker, Edward R., Model of Loening Monoplane Constructed by 517
- Warner, Edward P.:
  - Analysis—Fuselage Stress by 119
  - Notes on the Theory of the Accelerometer 681
  - Preliminary Report on Free-Flight Tests by 545, 579, 649, 677
- Waterloo Aero Transportation Co., Aerial Service Started by 738
- Watkins, Rev. Aaron S., Prohibitionist to Make Aerial Campaign 868
- Watson, Lt. D. D., Prepares Aerial Photographic Maps of the Canal Zone..... 333
- Wave Soaring, By W. T. Thomas 616
- Weather Bureau, Requested AERIAL AGE to Collect Meteorological Information.. 249
- Weaver Aircraft Co, Marketing Parasol Monoplane 251
- Webster, Clifford L., The American Tranc-Oceanic Largest Passenger (photo) .. 216
- Weigler, William R., "Aeronautical Camouflage," by 288
- Weimer, Edw. W., Jr., Makes Aerial Honeymoon Tour 320
- Weiss, Jacques, Official World Speed Record 326
- Werner, George J., Will Stump in Aeroplane 706
- Western Air Line Syndicate Plans Aerial Service 321
- Whelan, Pilot B. L., Has made a New Three-Passenger Height Record 432
- Whitney, Harry Payne, Aeronautic Patents Situation—Problem Almost Solved in 1915 573
- Wightman, Frank, Photo of............... 738
- Wilson, 2nd Lt., John H.:
  - Leaps 19,800 Feet with Parachute.... 505
  - Photo of 551
- Wilson, Col. W. K., Winner in Race from Washington to Central Park, L. I..... 505
- Wind Tunnels, Description of Apparatus for Measurement in a Wind Tunnel of the Performance of an Airscrew or the Windage Torque of a Rotary Engine, by A. Page, H. E. Collins and T. H. Fewster 118
- Wings:
  - Alulu High-Lift Wing 836
  - New Handley Page Wing 296
  - New High-Lift Wing................ 774
  - "Preliminary Choice of a Wing Section," by 839
- Wing Profiles, by John F. McMahon........ 127
- Wing Surfaces, Determination of the Pressure Law, by S. E. Slocum, Ph. D... 188
- Wireless Telephones:
  - Commercial Talk Held with Aeroplane by 832
  - Link Warships and Aeroplanes in Japan 716
- Wisenant, Oscar H., Photo of 804
- Woodhouse, Henry:
  - Affidavit Presented to Supreme Court by 798
  - Attorney General Requests Memorandum Setting Forth Names of Witnesses in Conspiracy Charges 768
  - Evidence of Conspiracy to Destroy Aero Club of America Submitted to Supreme Court of New York, by....703, 733
  - Purposes of Irregular Meeting of A.C.A. Called for August 16, Violate New York State Laws.................. 765
  - $250,000 Suit for Damages Started Against the New York Evening Post by 471, 504
- Woodland Flyers' Club Plans Big Aviation Meet 834
- Woodman, Arthur K., The America Trans-Oceanic Largest Passenger (photo of) 216
- Wright Aeronautical Co., of America:
  - Moves to Paterson, N. J............... 577
  - Plans Have Been Completed for New Building 321
- Wright Memorial at Le Mans, France 262
- Wright, Orville:
  - Aeronautic Patents Situation as Related to 573
  - Awarded John Fritz Medal 358
- Wright, Wilbur:
  - Aircraft Tender to be Named 286
  - To Unveil Monument to.............. 641
- Wyoming Valley Aero Club, First Regular Meeting 641

Y

- Yakima Aviation Co., Campaign of Education in Aviation Started by 770
- Y. M. C. A., Flying School Started by Los Angeles 833
- Yolo Fliers' Club Opens New Field....... 833

Z

- Zeppelins:
  - German Zeppelin Airship L-71 Surrendered to England 586
  - Germans Give Up Giant Zeppelin 652
  - May Circle Globe 800
  - Parisians Hail with Joy Arrival of.... 844
  - Super-Zeppelin Delivered to France.... 684
  - Transatlantic Zeppelin Ordered by American Firm 684
  - Versailles Treaty Allocated to France Two Zeppelins 442
- Zimmer, R. R., Personal Par. 582
- Zuloga, Capt., Intends to Attempt to Cross the Atlantic 652

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